

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 20, PART 12

NEW OR NOTEWORTHY PLANTS FROM
COLOMBIA AND CENTRAL
AMERICA—8

By HENRY PITTIER



WASHINGTON
GOVERNMENT PRINTING OFFICE
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PREFACE.

The present paper by Henry Pittier consists mainly of revisions of critical groups of Middle American trees, the more important dealing with *Machaerium*, *Pithecollobium*, and *Lucuma*, of the families Fabaceae, Mimosaceae, and Sapotaceae. There are included also a key to the Mexican and Middle American species of *Vitex*, with descriptions of several new species, and a revision of the cucurbitaceous genus *Calycophysum*. Descriptions of three new species of *Zanthoxylum* from Panama are contributed by Mr. Percy Wilson, of the New York Botanical Garden.

FREDERICK V. COVILLE,
Curator of the United States National Herbarium.



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NEW OR NOTEWORTHY PLANTS FROM COLOMBIA AND CENTRAL AMERICA—8.¹

BY HENRY PITTIER.

INTRODUCTION.

Another installment is here offered of results obtained by the writer in his study of the botany of Middle America. As in previous papers, the groups dealt with are largely trees, which, from the difficulty of securing adequate herbarium material, have been greatly neglected and misunderstood.

MYRISTICACEAE.

Virola merendonis Pittier, sp. nov.

A large tree, up to 25 meters high, the trunk straight, the branching radiate, forming a short depressed conical crown; bark grayish, smooth; young branchlets and leaf buds densely rufous-tomentose.

Leaves large, petiolate, subcoriaceous; petioles 1 cm. long, about 4 mm. thick, densely rufous-tomentose, the upper groove bordered on each side by a narrow wing running from the stem to the base of the blade; leaf blades oblong-lanceolate, truncate and usually emarginate at the base, gradually attenuate and very acute or seldom rounded-obtuse at the apex, 18 to 25 cm. long, 7 to 8 cm. broad, minutely reticulate above and glabrous except on the costa, softly tawny-tomentose beneath, the costa subimpressed and hairy on the upper face of the leaf, very prominent and reddish-hairy beneath, the veins 20 to 25 pairs, impressed above, prominent and reddish-hairy on the lower face, arcuate and distinctly confluent along the margin, the transverse venules hardly visible on either side, but more so beneath. Flowers not known.

Fruiting racemes about 6 cm. long, bearing 2 to 6 fruits; pedicels 7 to 10 mm. long; fruit subglobose, about 2 cm. long and 1.7 cm. in diameter, at first rufous-furfurascent, later glabrous.

Type in the U. S. National Herbarium, no. 1,012,334, collected in the forests of Cuchillitas, between Arranca Barba Hills and Mohanes, in the Cordillera de Merendon, borders of Guatemala and Honduras, in fruit, May 18, 1919, by H. Pittier (no. 8530).

Another collection was made in the Molha Valley in the same region, on the same date, by Whitford and Stadtmiller (no. 12).

It is not without hesitation that a new species is based upon the incomplete specimens at hand. There are, however, three species of *Virola* described from Central America, *V. guatemalensis* (Benth.) Warb., *V. panamensis* (Benth.) Warb., and *V. warburgii* Pittier, none of which compares satisfactorily in the

¹No. 7 of this series was published as Part 3 of the present volume (pp. 95-132, pl. 7).

characters of the leaf with the newly collected plant. In *V. guatemalensis* there are, it is true, 15 to 30 primary veins, but these are not distinctly confluent along the margin, and, besides, the blades are cuneate and not truncate-emarginate at the base, and obtuse and not very acute at the apex; they are also said to be glabrate and pellucid-punctate, with petioles about half shorter. From *V. panamensis* and *V. warburgii* the newly discovered tree differs in the greater number of veins, so that a further comparison is hardly necessary. There may be a great variation in the shape of the leaves in *V. guatemalensis*, to which the specimens here described may then be added, but this can be decided only after the flowers of both forms are known.

Compsonneura sprucei (A. DC.) Warb. Nov. Act. Acad. Caes. Leop. Carol. 68: 143. 1897.

Myristica sprucei A. DC. in DC. Prodr. 14: 199. 1856.

Myristica mexicana Hemsl. Biol. Centr. Amer. Bot. 3: 67. pl. 73. 1882.

Warburg has commented on the remarkable identity of specimens growing as far apart as Mexico and the Amazon Valley. Although I also consider it probable that the examination of adequate material from both areas may result in the recognition of a distinct Middle American type, for which the name *Myristica mexicana* Hemsl. is available, attention may be called to the fact that other plants, such as *Dialium divaricatum*, *Tecoma pentaphylla*, and *Calophyllum calaba*, have quite as wide a distribution. These are better known on account of having some economic application, while the former, not being of any specific use to man, has been more or less ignored. In fact, it may be found to be widely dispersed between the two extreme points from which it has been reported.

The fruit and seed have been lacking in all described specimens. A description of these follows:

Pedicels 8 to 15 mm. long, glabrous, bearing at about the middle the persistent perigonium; fruit ovoid, 3 cm. long, 2.3 cm. in diameter, the pericarp dehiscent, bivalvate, thin, glabrous; seed ovoid, 2.6 cm. long, 1.7 cm. in diameter, completely surrounded by a membrane-like yellow aril; exosperm finely ruminate; embryo very small, ruminate.

The fruiting specimens from which the description is drawn were collected by Whitford and Stadtmiller on the trail from Los Amates, Guatemala, to La Florida, Honduras, in May, 1919. I find also in the National Herbarium the following specimens:

MEXICO: Atasta, Tabasco, in shaded places, flowers, June 30, 1889, *Rovirosa* 517.

HONDURAS: San Pedro Sula, Department of Santa Barbara, flowers, September, 1888, *Thieme* (J. D. Smith, no. 5256).

Dialyanthera latialata Pittier, sp. nov.

A tree, 8 to 15 meters high, the trunk straight, the branchlets glabrate.

Leaves large, alternate, membranous, entirely glabrous, congested at the ends of the branchlets, the petioles 1 to 2.5 cm. long, broadly alate through the decurrence of the blade, this broadly obovate, long-attenuate toward the base, short-acuminate at the apex, 20 to 30 cm. long, 9 to 10 cm. broad, dark green above, brownish-glaucous beneath, the costa and primary veins impressed above, the former very prominent and stout, the latter 20 to 25, slender, slightly arcuate, anastomosing along the margin of the blade. Staminate inflorescences axillary or on defoliate nodes, up to 20 cm. long, the main rachis usually ternate, glabrous, the flowers ebracteate, brownish yellow, in opposite sessile clusters; pedicels slender, 7 to 11.5 mm. long; perianth about 3 mm. long, 3-fid,

the lobes oblong to ovate, obtuse, 2 mm. long, at first erect, later reflexed; stamen column 1.5 mm. long, thicker at the base; anthers 3, ovate, 0.3 mm. long, subconnate. Pistillate inflorescence and fruit not known.

Type in the U. S. National Herbarium, no. 679296, collected in forests along the Fató River above Nombre de Dios, Caribbean coast of Panama, in flower (male only), August 16, 1911, by H. Pittier (no. 4193).

Of the two known species of *Dialyanthera*, *D. otoba* (H. B. K.) Warb. has leaves with only 9 to 15 primary veins, and almost wingless petioles, inflorescences with alternate flower clusters, and floral pedicels hardly longer than the perianth; *D. gordonifolia* (A. DC.) Warb. has 15 to 20 primary veins and narrowly winged or subulate petioles, alternate flower clusters, and pedicels shorter than the flowers. These characters are sufficient to show that the species just described, in which the leaves have from 20 to 25 primary veins and broadly winged petioles, the flower clusters are opposite, and the pedicels are several times longer than the perianth, is a very distinct type.

Warburg refers to an unknown species of *Dialyanthera* from Chiriquí, Panama, represented by fruits in the museum at Munich, which may belong to this species. However, a fourth species is known from the rain forests of Costa Rica; it has been identified by John Donnell Smith as *D. otoba*, but I consider this determination doubtful. In the Costa Rican tree the branchlets are pubescent, not glabrous, the petioles are 2 cm. long or more and distinctly but narrowly winged; the blades are quite opaque and not pellucid-punctate, and acute rather than abruptly acuminate; and the inflorescences are usually geminate in the axils. A decision should be reserved, however, until we have the necessary material for comparison.

MIMOSACEAE.

THE SPICATE-FLOWERED SPECIES OF *PITHECOLLOBIUM* OF THE *UNGUIS-CATI* SECTION.

INTRODUCTION.

The spicate-flowered species of *Pithecollobium* of the *Unguis-cati* section include four groups, represented, respectively, by *P. pachypus*, *P. hymenaeaeifolium*, *P. ligustrinum*, and *P. oblongum*. This last group contains forms with very short spikes, indicating a transition to the globose-flowered species of the same section.

Pithecollobium pachypus is distinguished mainly by its relatively enormous pods, these thick and short, with the few seeds large in proportion. It has been collected only once, in El Salvador, and seems to represent a peculiar type without close relatives.

The pods of the 12 remaining species are usually long, terete, and more or less curved, very rarely short but then flat; that is, they are of the type characteristic of the section. *P. hymenaeaeifolium* and *P. ligustrinum* differ from *P. oblongum* in having a sessile ovary, flower spikes scattered along the branchlets, and an almost always exerted stamen tube. In the group of *P. oblongum* the ovary is stipitate and the spikes are borne on special axillary branchlets forming true panicles, and the stamen tube is always inclosed.

These differences are fundamental, and sufficient to characterize the groups.

Pithecollobium hymenaeaeifolium is distinguished from *P. ligustrinum* by its large flowers, each with a strikingly developed stamen tube. *P. macrostachyum*, an imperfectly known species, is, according to description, a closely similar if not identical form. In the group of *P. ligustrinum*, with six easily distinguishable species or subspecies, the species are separated primarily by the size and nature of the stipules, the shape of the bractlets, the presence or absence of indument on the ovary, and other characters which seem to be very constant.

With the well-characterized group of *P. oblongum* an approach is made to the globose-flowered species of *Pithecollobium* of the same section. This group presents two almost parallel series, differentiated by a single but apparently constant character, the length of the ovary stipe. In each group we have two species, the one with stipitate petiolar glands, the other with sessile glands. The number of flowers in each spike is much reduced in the last two species of the series, the more so in *P. subglobosum*, which might be placed among either the *Spicatae* or the *Globosae* but for their possession of characters showing their affinity with *P. oblongum*.

KEY TO SPECIES.

Legume short, terete, and very thick, the valves about 2 cm. broad. Petioles very short; calyx and corolla grayish-hairy----- 1. *P. pachypus*.

Legume rather long and slender, sometimes flat, the valves narrow.

Ovary sessile; spikes usually single in the axils; stamen tube usually exserted.

Corolla 8.5 mm. long or more; stamen tube very long-exserted.

Stamen tube seldom over 2.5 cm. long; corolla 12 to 13 mm. long; leaflets ovate-lanceolate, up to 13 cm. long-- 2. *P. hymenaeaeifolium*.

Stamen tube up to 3.8 cm. long; corolla 8.5 to 11 mm. long; leaflets ovate-oblong, up to 8 cm. long-----3. *P. macrostachyum*.

Corolla 7 mm. long or less; stamen tube moderately exserted.

Stipules spinulose or obsolete; ovary glabrous----- 4. *P. spinulosum*.

Stipules spinescent, strong, rarely obsolete; ovary pubescent or hairy.

Bractlets lance-subulate, subpersistent, often as long as the calyx.

Corolla 6 to 7 mm. long; stamen sheath exserted about 2 mm.

5. *P. insigne*.

Corolla 5 to 6 mm. long; stamen sheath exserted about 5 mm.

6. *P. calostachys*.

Bractlets small, scalelike, much shorter than the calyx.

Calyx 1 to 1.2 mm. long----- 7. *P. macrosiphon*.

Calyx 2 to 3 mm. long.

Stipular spines long (up to 2 cm.); interpetiolar stipules subulate; corolla minutely pubescent-----8. *P. lanceolatum*.

Stipular spines short (seldom over 0.5 cm.); interpetiolar stipules acute-triangular and very short; corolla conspicuously silky-pubescent----- 9. *P. ligustrinum*.

Ovary distinctly stipitate; spikes in axillary panicles; stamen tube almost always included.

Stipe of the ovary not over 1 mm. long. Ovary glabrous.

Petiolar glands sessile or substipitate; inflorescences stout, grayish-hairy; leaflets pilosulous all over----- 10. *P. paniculatum*.

Petiolar glands distinctly stipitate; inflorescences slender, glabrous or villosulous; leaflets glabrous except at the barbate base.

11. *P. pulchellum*.

Stipe of the ovary 2 mm. long or over.

Leaflets oblong or obovate, up to 5 cm. long, usually narrow and obtuse at the apex; glands sessile; ovary hairy----- 12. *P. oblongum*.

Leaflets not over 2 cm. long, broadly ovate, usually emarginate at the apex; glands stipitate; ovary glabrous----- 13. *P. subglobosum*.

DESCRIPTION OF SPECIES.

1. *Pithecollobium pachypus* Pittier, sp. nov.

A small tree, the bark brownish gray, minutely lenticellate on the younger branchlets, these glabrous or glabrescent and stiff.

Leaves bipinnate, coriaceous, the basal stipules spinescent, straight, slender, acute, up to 5 mm. long; petioles canaliculate, more or less hairy in the deep recesses, the main petiole 0.5 to 1 cm. long, with a discoid sessile apical gland; pinnae unijugate, the interpetiolar stipules triangular-acute, very short, hairy, caducous, the secondary petioles 4 to 6 mm. long, the apical gland small and often obsolete; leaflets unijugate, sessile, oblique-ovate, obtuse and often emarginate at the apex, barbate at the base on the inner half, 2.5 to 5 cm. long, 1.5 to 3 cm. broad, the venation very prominent on the upper side, less so on the lower side.

Racemes axillary, subpaniculate at the ends of the branchlets, the rachis 4.5 to 7 cm. long, grayish-hairy; bracts up to 6 mm. long, hairy, formed by a residual petiole with the apical gland and ending with the reduced interpetiolar stipule; bractlets linear-subulate, very small, hairy; flowers white, densely grayish-hairy, 15 mm. long; calyx tubular, 3 mm. long; corolla 5 to 6 mm. long; stamen tube exserted; pistil 15 mm. long, glabrous.

Legume dehiscent, 6 to 8 cm. long, about 1.5 cm. in diameter, 2 to 4-seeded, the valves 2 cm. broad; seeds ovoid-depressed, up to 2 cm. broad, brown and lustrous.

Type in the U. S. National Herbarium, no 399510, collected in the vicinity of San Salvador, El Salvador, in 1905, by Carlos Renson (no. 218).

Clearly related to *P. ligustrinum* (Jacq.) Klotzsch, but differing by its short petioles, the hairiness of the calyx and corolla, and, above all, by the short, uncommonly thick pods. It is known locally under the name of "abracade."

2. *Pithecollobium hymenaeaeifolium* (Humb. & Bonpl.) Benth. Lond. Journ. Bot. 3: 198. 1844.

Inga hymenaeaeifolia Humb. & Bonpl.; Willd. Sp. Pl. 4: 1008. 1806.

Mimosa hymenaeaeifolia Poir. in Lam. Encycl. Suppl. 1: 38. 1810.

Pithecollobium panamense Walp. & Duchass. Linnaea 23: 746. 1850.

A shrub or a small tree, up to 4 meters high, the bark of the branchlets grayish, smooth, glabrous.

Leaves bipinnate, glabrous, the stipules spinescent, strong, more or less arcuate, up to about 1 cm. long; petioles stout, canaliculate, the main one 1 to 3.5 cm. long, with a large sessile cupulate gland at the apex; pinnae unijugate, the interpetiolar and interfoliar stipules small, apiculate, puberulous,

often obsolete; secondary petioles 1 to 2.5 cm. long, the apical gland small and sometimes obsolete; leaflets unijugate, subpetiolulate, coriaceous, obliquely ovate-lanceolate or elliptic-lanceolate, obtuse at the apex, semicordate at the base, 4 to 12.5 cm. long, 2.5 to 5.5 cm. broad, the reticulate venation conspicuous on both faces.

Inflorescences spicate, single in the axils and often paniculate at the ends of the branchlets, the rachis 4-sulcate, puberulous, 7 to 12 cm. long, the flowers densely massed on the upper half; bracts often none, or represented by residual petioles; bractlets small, hairy, scaly, deciduous; flowers large, white, sessile; calyx 2.5 mm. long, densely gray-pubescent, the teeth broad and irregular; corolla 12 mm. long or over, densely grayish-sericeous, the lobes broad and subacute; stamen tube up to 25 mm. long, long-exserted; pistil up to 4 cm. long, the ovary sessile, grayish, appressed-hairy, the style glabrous.

Legume not known.

Type from Caripe, near Cumaná, Venezuela. The description given above is based upon flowering specimens collected near Miraflores, Canal Zone, Panama, July, 1911, *Pittier* 3969, and at Chepo, Panama, October, 1911, *Pittier* 4772.

The original description of this species, assuming it really applies to the Panama plant, is very unsatisfactory. Willdenow describes the stipular spines as "rectae vix visibiles minutissimae," while in fact they are large, strong, and always more or less recurved; and the leaflets are decidedly lanceolate rather than ovate-oblong. Benthams had not seen the plant when he wrote his first description² and it is likely that the more complete diagnosis given in his later memoir³ is founded on Panama specimens. Walpers and Duchassaing described their Panama collection of this plant as *P. panamense*,⁴ but if Humboldt and Bonpland's name has been properly applied by Benthams, it would seem that the isthmian species is identical with the Venezuelan one. Walpers and Duchassaing described the ovary as glabrous, but in all the specimens I have dissected I found it densely appressed-hairy.

3. *Pithecollobium macrostachyum* (Vahl) Benth. Lond. Journ. Bot. 5: 105. 1846.

Mimosa macrostachys Vahl, Eclog. Amer. 3: 34. pl. 26. 1807.

Inga macrostachya DC. Prodr. 2: 427. 1825.

This species, collected in Cayenne by von Rohr, and described by Vahl as *Mimosa macrostachys*, does not seem to have been reported again. Benthams considered it at first as synonymous with *P. lanceolatum*, but later⁵ corrected himself as follows:

"Since I have seen von Rohr's specimen of the species described by Vahl, I am inclined to think that I have confounded two distinct plants. In the one, *P. macrostachyum*, independently of the great length of the spike, the flower itself is 12.5⁶ mm. long, and the staminal tube projects 25 mm. beyond it; this species I have only seen from Cayenne. The other, *P. lanceolatum*, is indeed variable as to dimensions, but I never have seen the flower more than 6.3 mm., nor the staminal tube project more than 4 mm. beyond it; the form and size of the bracts are also very variable. This would include all my stations and synonyms except Vahl's."

² Lond. Journ. Bot. 3: 198. 1844.

³ Trans. Linn. Soc. 30: 572. 1875.

⁴ Walp. Repert. Bot. 2: 458. 1843.

⁵ Lond. Journ. Bot. 5: 105. 1846.

⁶ In order to facilitate comparisons, I have reduced the lines to millimeters.

4. *Pithecollobium spinulosum* Pittier, sp. nov.

A tree, 7 to 10 meters high, the trunk up to 40 cm. in diameter; branchlets slender, flexible, with a grayish white, lenticellate bark.

Leaves bipinnate, glabrous, the stipules spinuliform, very much reduced, acute; petioles canaliculate, the main one 0.6 to 2 cm. long, with a sessile cupular apical gland; pinnae unijugate, the interpetiolar and interfoliar stipules conspicuous, subulate, spinulose, up to 3 mm. long, the secondary petioles 0.8 to 2.5 cm. long, with an apical gland; leaflets unijugate, obliquely ovate-lanceolate, obtuse at the apex, cuneate within and rounded without at the base, 2.5 to 8.5 cm. long, 1 to 4 cm. broad, light green above, paler beneath, the venation prominent on both faces.

Inflorescences spicate, loosely paniculate at the ends of the branchlets, the rachis 6 to 10 cm. long, slender, glabrous; bracts up to 5 mm. long, glabrous, with a large gland at the apex; bractlets scaly, canescent, very small; flowers sessile, slender, minutely pubescent, white, rather loose; calyx tubular, 2 to 2.5 mm. long; corolla tubular, 5 to 6 mm. long, slightly broader at the apex, the lobes about 1 mm. long; stamen tube short-exserted; pistil glabrous, dimorphous, the short form about 2.5 mm. long, the long one up to 16 mm. long.

Legume dehiscent, subsessile, glabrous, arcuate or more or less circinnate, acute at the apex, the valves 10 to 13 mm. broad.

Type in the U. S. National Herbarium, no. 920173, collected in the Lands of Loba, Department of Bolívar, Colombia, April or May, 1916, by H. M. Curran (no. 169). This collection represents the form with short style.

Another collection was made at San Martín de Loba, same region, on the same date, Curran 48. This is the form with long style.

This tree has the leaves of *P. lanceolatum*, but with very conspicuous spinulose petiolar stipules. The inflorescences are loose, with glabrous rachis and peculiarly shaped bractlets, which evidently represent the remnant of a petiole with its terminal gland. The flowers are like those of *P. ligustrinum*, except that the ovary is glabrous.

5. *Pithecollobium insigne* M. Micheli, Bot. Gaz. 20: 285. 1895.

A tree or shrub, the young branchlets puberulous.

Leaves bipinnate, glabrous; petioles canaliculate, pilosulous, the main one 5 to 6.5 cm. long, with a small apical gland; pinnae unijugate, the interpetiolar and interfoliar stipules slender, acute, and sometimes glandular, the secondary petioles 2 to 4 cm. long; leaflets unijugate, subpetiolulate, large, subfalcate, obliquely ovate-lanceolate, 9 to 12.5 cm. long, 3.5 to 4.5 cm. broad, acuminate or acute at the apex, glabrous, dark green above, paler beneath, the venation prominulous on both sides.

Spikes axillary or paniculate at the ends of the branchlets, loose, not very thick, tomentose, the rachis 10 to 18 cm. long; bracts small, spinulose, caducous; bractlets lanceolate-subulate, hairy, often almost as long as the calyx, subpersistent; calyx sessile, densely grayish-velvety, 4 mm. long, 5 to 7-toothed; corolla 6 to 7 mm. long, densely grayish-pubescent; stamen tube exserted; pistil up to 22 mm. long, the ovary sessile, appressed-hairy.

Type in the John Donnell Smith Herbarium, collected at San Pedro Sula, Department of Santa Bárbara, Honduras, April, 1890, by C. Thieme (J. D. Smith, no. 5203).

The above description is based partly upon specimens and partly upon Micheli's description.

The original specimens are, unfortunately, incomplete, but the species appears to be well characterized by its long-petiolate leaves and elongate spikes, and by its bracteoles. Micheli seems to have been uncertain as to its position in the

genus, though there can be no doubt as to its belonging to the *P. ligustrinum* group.

6. *Pithecollobium calostachys* Standl. Contr. U. S. Nat. Herb. 20: 190. 1919.
Tamaulipas to Chiapas, Mexico; type (*Palmer* 307) collected near Tampico, Tamaulipas.

7. *Pithecollobium macrosiphon* Standl. Contr. U. S. Nat. Herb. 20: 191. 1919.
Based upon *Nelson* 3398, from Chiapas, Mexico.

8. *Pithecollobium lanceolatum* (Humb. & Bonpl.) Benth. Lond. Journ. Bot. 5: 105. 1846.

Inga lanceolata Humb. & Bonpl.; Willd. Sp. Pl. 4: 1005. 1806.

Mimosa lanceolata Poir. in Lam. Encycl. Suppl. 1: 37. 1810.

A middle-sized tree, with rounded crown, the trunk short, the bark rimose or smooth, grayish or brownish, often white-lenticellate on the branchlets.

Leaves bipinnate, almost entirely glabrous, the basal stipules spinescent, straight, acute, 0.8 to 2.1 cm. long, rarely obsolete; petioles canaliculate, the main one 1.3 to 4 cm. long, with a small discoid sessile apical gland; pinnae unijugate, the interpetiolar stipule subulate, 1 to 3 mm. long, the secondary petioles 0.5 to 2 cm. long, the apical gland small and often obsolete; leaflets unijugate, coriaceous, sessile, oblique-ovate or lanceolate, broadly obtuse or subacuminate at the apex, 2 to 7.5 long, 1 to 4 cm. broad, the inner half cuneate and the outer half broadly rounded at the base, the venation more or less conspicuous on both faces.

Racemes paniculate at the ends of the branchlets, the rachis 4 to 12 cm. long, slender, grayish or brownish pubescent; bracts lanceolate, acute, hairy, often 3 mm. long caducous; bractlets very small, scaly, hairy; flowers 12 to 20 mm. long; calyx 3 mm. long (sometimes less), grayish-pubescent; corolla tubular-campanulate, 5 to 6 mm. long, grayish-pubescent, the lobes acute, about 1 mm. long; stamen tube included or more or less exserted; ovary grayish-hairy, sessile or stipitate, the style 10 to 17 mm. long, glabrous or sparsely villous.

Legume torulose, glabrous, 8 to 12-seeded, dehiscent, 10 to 14 cm. long, the valves about 1 cm. broad; seeds small, black.

The type of this species is said to be from Nova Barcelona, which now comprises the States of Anzoategui and Sucre, Venezuela. The above description is based mainly upon *Nelson* 4314.

SPECIMENS EXAMINED:

MEXICO: Mazatlán, Sinaloa, flowers, April 1, 1910, *Rose, Standley & Russell* 13852. Villa Unión, Sinaloa, flowers, April 2, 1910, *Rose, Standley & Russell* 13950. Rosario, Sinaloa, flowers, *Rose* 3162, *Rose, Standley & Russell* 14520. San Blas, Tepic, flowers, April 20, 1897, and June 6, 1897, *Maltby* 17, *Nelson* 4347. San Luis Potosí to Tampico, flowers, 1878-1879, *Palmer* 1061. Tampico, flowers, April 27, 1897, *Pringle* 7681. Marfa Magdalena Island, flowers, May 26, 1897, *Nelson* 4314, *Maltby* 104. Vicinity of Gómez Farias, Tamaulipas, flowers, April 13-21, 1907, *Palmer* 282.

COSTA RICA: Vicinity of Nicoya, Province of Guanacaste, flowers, April, 1900, *Tonduz* (Inst. Fís. Geogr. Costa Rica, no. 13892).

VENEZUELA: Cardenas, Siquire Valley, Miranda, altitude about 500 meters, flowers, March 20, 1913, *Pittier* 6002. La Marquesa, near Guatire, Miranda, altitude 320 meters, flowers, May 12, 1918, *Pittier* 7841.

In the straight slender spines, the general shape of the leaves, whose venation is prominent on the upper face, and the paniced inflorescences at the ends of the branchlets, these specimens agree with Willdenow's description of *P.*

lanceolatum, but it is by no means certain that they correspond to his Venezuelan type. They can be distinguished easily from *P. ligustrinum* by the long straight spines, the subulate interpetiolar stipules, and the silky gray pubescence of the flowers. In the flowers the only definite characters, besides the pubescence, seem to be the length of the calyx, the shortness of the corolla tips, and the hairiness of the ovary. The corolla varies in length from 5 to 6 mm.; the ovary is either sessile or stipitate; and the length of the style varies from 9 to 17 mm. There are included here specimens with shorter stipular spines, directed upward, which, however, agree with the description in their other characters.

9. *Pithecollobium ligustrinum* (Jacq.) Klotzsch; Benth. Trans. Linn. Soc. 30: 571. 1875.

"*Mimosa ligustrina* Jacq. Fragm. Bot. Illustr. 29. pl. 32. f. 5 1800-1809."

Inga ligustrina Willd. Sp. Pl. 4: 1007. 1806.

A tree 5 to 12 meters high, the trunk up to 35 cm. in diameter; bark smooth or rimose on the trunk, densely punctate on the branchlets.

Leaves bipinnate, the basal stipules spinescent, straight, acute, 4 to 5 mm. long; petioles glabrous or puberulous, canaliculate, the main one 0.5 to 3 cm. long, with a discoid sessile apical gland; pinnae unijugate, the interpetiolar stipules acute, broad and short, the secondary petioles 0.4 to 1 cm. long, with a smaller sessile cuplike apical gland; leaflets unijugate, sessile, oblique-oblong or lanceolate, obtuse or rounded at the apex, 2 to 6.5 cm. long, 1.2 to 3 cm. broad, the outer half rounded and the inner half cuneate at the base, the upper face light green, glabrous and nitidulous, the lower face paler, glabrous except for a small hairy spot at the base on the inner side of the costa; venation reticulate, prominent on both sides.

Racemes axillary or paniculate at the ends of the branchlets, the rachis 5 to 8 cm. long, slender, pubescent; bracts very small, furfuraceous, caducous; bractlets shorter than the calyx, deciduous; flowers sessile, white, numerous; calyx tubular, 2 mm. long, irregularly 5-toothed, minutely pubescent, corolla tubular-campanulate, 5.5 mm. long, minutely pubescent, the lobes about 2 mm. long, ovate-lanceolate; stamen tube inclosed or short-exserted; pistil 6 mm. long, the ovary sessile, pubescent, ovoid, 1.5 to 2 mm. long, about 10-ovulate, the style minutely puberulous.

Legume subterete, glabrous, 8 to 12 cm. long, straight or curved, dehiscent, the valves becoming twisted; seeds compressed, rounded, black, half covered with a white aril.

Type from Caracas, Venezuela. The above description is based upon my specimens collected between Valencia and Maracay, Venezuela.

SPECIMENS EXAMINED:

MEXICO: Las Salinas, Michoacán, altitude 20 meters, flowers, May 9, 1889, *Langlassé* 151. Rosa Morada, Tepic, flowers, June 23, 1897, *Nelson* 4358. Tlacotalpam, Veracruz, flowers, May 21, 1894, *Nelson* 499. Aconapeta, Tepic, flowers, June 25, 1897, *Rose* 1470. Culiacán, Sinaloa, flowers and fruits, November 11, 1904, *Brandege*.

GUATEMALA: San José de Guatemala, on the Pacific coast, flowers, July 26, 1860, *Hayes*.

COLOMBIA: Santa Marta, near sea level, flowers, August, *H. H. Smith* 104.

VENEZUELA: La Victoria, Aragua, altitude 600 meters, flowers, May, 1898, *Jahn* 213. Between Valencia and Maracay, Carabobo, flowers, January 31, 1918, *Pittier* 7725. Near Colonia Tovar, *Fendler* 1875. Island of Margarita, at El Valle, flowers, July, 1903, *Miller & Johnston* 38,121,242.

The plant of Jacquin does not seem to be the same as that described later by Vahl,⁷ on specimens from Santa Marta. In plate 27 of the *Eclogae* there is shown a leaf with three pinnae, each with one terminal pair of leaflets and with another of these near the base. The floral spikes seem to be fasciculate on a defoliate node. In Vahl's description of the species no mention is made of these additional leaflets, and the plant is said to be unarmed. I had no access to Jacquin's diagnosis and plate, but Willdenow's description, based on Jacquin's, applies very well to what is here considered as *P. ligustrinum*.

10. *Pithecollobium paniculatum* Pittier, sp. nov.

A bushy shrub about 4 meters high; bark of the branchlets brownish, glabrous.

Leaves bipinnate, the basal stipules spinescent, subacicular, up to 10 mm. long; petioles canaliculate, rather stout, hairy, the primary ones 0.6 to 2.5 cm. long, the apical gland small, substipitate, often obsolete; interpetiolar and terminal stipules very small, broad at base and acute at the apex; secondary petioles 0.5 to 1 cm. long, with or without an apical gland; leaflets unijugate, sessile, obovate or ovate, broadly rounded or emarginate at the apex, 2 to 4.5 cm. long, 1 to 3 cm. broad, pilosulous above, more so on the costa, pilosulous or even hairy on the costa beneath, the venation prominent on both faces.

Racemes forming axillary erect panicles up to about 7 cm. long, the rachis densely villous-canescens; bracts about 6 mm. long, formed by residual petioles, with the apical gland and stipule; racemes up to 4 cm. long, the peduncles about 2 cm. long, the flowers densely massed on the terminal part; bractlets subulate, hairy, 1 to 1.5 mm. long, caducous; calyx broad, woolly-hairy, 1.5 to 2 mm. long; corolla broadly tubular-campanulate, about 4.5 mm. long, minutely silky-pubescent, the lobes lanceolate, acute, 1.5 to 2 mm. long; stamen tube broad, included; pistil 9 to 10 mm. long, glabrous, long-stipitate (the stipe 1.2 mm. long), 7 to 10-ovulate.

Legume not seen.

Type in the U. S. National Herbarium, no. 674696, collected at San Gerónimo, Oaxaca, Mexico, December 9, 1906, by C. B. Doyle (no. 36).

A very distinct type, characterized by the disposition of the racemes in axillary panicles, the small woolly flowers, the long-stipitate ovary, and the hairiness of the leaves.

11. *Pithecollobium pulchellum* Pittier, sp. nov.

Bushy, the branchlets thick, stiff, covered with a glabrous brownish bark.

Leaves bipinnate, the basal stipules spinescent, slender, acute, up to 6 mm. long; petioles canaliculate, slender, pubescent or glabrescent, the primary ones 0.4 to 1.4 cm. long, with a small, roundish, distinctly stipitate apical gland; interpetiolar and apical stipules small, spinulose, indurate; secondary petioles 2 to 6 mm. long, the substipitate apical gland often obsolete; leaflets unijugate, subsessile, ovate, broadly rounded or subemarginate to subacute and mucronate at the apex, rounded on one side and cuneate on the other at the base, 1.3 to 3 cm. long, 0.6 to 2.3 cm. broad, glabrous above except on the minutely pubescent petiolule, paler beneath and glabrous except for a white tuft of hairs (sometimes obsolete) at the base of the inner half; venation prominulous on the lower face, almost obsolete on the upper face.

Racemes very short, grouped in distinct axillary panicles, the rachis 1 to 2 cm. long, very slender glabrous or villosulous, the heads rather short; bracts villosulous, formed by residual glandular apiculate petioles; bractlets subulate, hairy, nearly as long as the calyx or longer, caducous; flowers sessile; calyx 1.5 mm. long, tubular, hairy; corolla 4.5 to 5 mm. long, minutely pubescent.

⁷ *Eclog. Amer.* 3: 34. pl. 27. 1807.

more so on the lobes; stamen tube broad, included; pistil up to 15 mm. long, glabrous, the ovary long-stipitate (the stipe 1 mm. long).

Legume not known.

Type in the Gray Herbarium, collected at Culiacán, Sinaloa, Mexico, by T. S. Brandegee, August 25, 1904.

This species is well characterized by its bushy habit, the small leaves with slender petioles provided with stipitate glands, the small inflorescences, and the long-stipitate ovary. Its affinities seem to be with *P. paniculatum* and *P. oblongum*, on account of the paniculate inflorescences and the stipitate ovary. It differs from both in the linear stipules, from the former in the pubescence and in the stipitate glands, and from the latter in the size of the corolla and in the shorter stipe of the ovary.

12. *Pithecollobium oblongum* Benth. Lond. Journ. Bot. 3: 198. 1844.

A shrub or small tree, the bark of the young branchlets brownish, more or less densely white-lenticellate.

Leaves bipinnate, subcoriaceous, the basal stipules spinescent, glabrous, straight, thick or slender, up to 1 cm. long; petioles canaliculate, glabrous or pilosulous, the main ones 0.6 to 2.2 cm. long, with a rather small sessile pertuse apical gland; pinnae unijugate, the interpetiolar and interfoliolar stipules triangular-acute and very small, the secondary petioles 0.6 to 1.5 cm. long, with minute apical glands; leaflets unijugate, oblong, oblong-ovate, or obovate, obtuse or sometimes emarginate at the apex, subcuneate at the base, 2.5 to 4.5 cm. long, 1 to 2 cm. broad, glabrous, the venation prominulous on both sides.

Spikes forming axillary panicles, the rachis appressed-pilosulous, the bracts residual, glandular, with a terminal unguiculate appendix; peduncles 1 to 2 cm. long, slender, hairy, the spikes very short and almost globose; bractlets minute, lanceolate, hairy, deciduous; flowers small, sessile; calyx 2 mm. long, grayish-hairy; corolla 5 to 5.5 mm. long, pubescent, the lobes subacute, 1.5 mm. long; stamen tube included; pistil 14 mm. long, the ovary hairy, long-stipitate (the stipe 2 mm. long).

Legume not seen; according to Bentham, flat before dehiscence, the valves 8.5 mm. broad.

Type from Panama (Cuming 1155). The present description is based upon specimens in the Gray Herbarium, from Santa Marta, Colombia, H. H. Smith 28a. This species is reported from the Gulf of Fonseca (Sinclair), Nicaragua (Oersted), Panama (Cuming, Seemann, Duchassaing), and Trinidad (Crueger).

Bentham's diagnosis and description apply to the Santa Marta specimens, except that in these the flowers are slightly larger.

13. *Pithecollobium subglobosum* Pittier, sp. nov.

A small tree or shrub, the bark of the young branchlets brownish gray.

Leaves bipinnate, small, submembranous, the basal stipules spinescent, rather slender, up to 5 mm. long; petioles slender, canaliculate, more or less pilosulous, the main ones 1 to 1.5 cm. long, with a small stipitate apical gland; pinnae unijugate, the interpetiolar and interfoliolar stipules more or less obsolete; secondary petioles 4 to 5 mm. long, with a minute apical gland; leaflets unijugate, subsessile, glabrous, obovate, broad and more or less emarginate at the apex, rounded at the base on the outer half, 1 to 2 cm. long, 0.7 to 1.3 cm. broad, the reticulate venation prominulous on both sides.

Spikes forming axillary panicles, the rachis minutely puberulous or pubescent, the bracts residual, 1 to 2 mm. long, glandular and appendiculate at the apex by the residual interpetiolar stipule; peduncles 1 to 1.7 cm. long, slender, the

flower spikes subglobose; bractlets lanceolate, acute, hairy, very small and deciduous; flowers small, sessile; calyx 2.5 mm. long, sparsely appressed-pubescent; corolla 8 mm. long, tubular but broader at the apex, minutely and sparsely appressed-pubescent, the lobes about 1 mm. long, narrow and obtuse; stamen tube included; pistil up to 20 mm. long, the ovary glabrous, long-stipitate (the stipe 3 mm. long).

Type in the Gray Herbarium, collected at Santa Marta, Colombia, altitude about 30 meters, in September, 1898 to 1901, by H. H. Smith (no. 309a).

This species differs from *P. oblongum* in the smaller and differently shaped leaflets, in the pedicellate glands, and in the larger flowers with a glabrous ovary.

FIVE UNDESCRIBED SPECIES OF PITHECOLLOBIUM OF THE SECTIONS SAMANEA AND CAULANTHON.

Pithecollobium discolor Pittier, sp. nov.

Section *Samanea*, series *Parviflorae*. A large tree with rounded crown, the branchlets more or less pubescent.

Leaves terminal, caducous, the rachis more or less grayish-pubescent, sometimes quite glabrous; petioles about 3.5 cm. long, canaliculate, with a large ovate gland about 1 cm. above the base; pinnae 1 or 2-jugate; leaflets 2 to 4-jugate, with interfoliolar depressed discoid glands between the upper or two upper terminal pairs; petiolules 1 mm. long or less, pubescent; blades coriaceous, ovate-lanceolate to lanceolate, acute at the base, obtuse at the apex, sparsely hairy or glabrous above, paler and more or less minutely pilosulous beneath, 1 to 5 cm. long, 0.6 to 2 cm. broad, the margin thick and slightly revolute.

Inflorescences axillary, paniculate at the ends of the branchlets, the main peduncles bearing at the apex several pediceled flower heads; peduncles and pedicels grayish-pubescent, the former 4 to 12 cm. long, the latter slender, 2 cm. long; flowers small, white, pediceled; pedicels 0.9 to 1 mm. long, pubescent; calyx campanulate, 1.5 to 2 mm. long, pubescent, the teeth broad, subacute; corolla 3 to 3.5 mm. long, glabrous, the lobes ovate-lanceolate, about 1 mm. long; stamen tube included; pistil about 11 mm. long, the ovary 2 mm. long, glabrous, substipitate.

Legume flat and thin, straight, acute at base and apex, substipitate, glabrous, 10 to 12-seeded, 10 to 17 cm. long, 1.5 to 1.8 cm. broad, the peduncle about 2.5 cm. long.

Type in the U. S. National Herbarium, no. 471907, collected at La Verbena, near San José, Costa Rica, altitude about 1,000 meters, December, 1894, by A. Tonduz (Inst. Ffs. Geogr. Costa Rica, no. 9077).

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: Forested hills, Nicoya, altitude about 300 meters, fruits, January, 1900, *Tonduz* (Inst. Ffs. Geogr. Costa Rica, no. 13531).

PANAMA: Hospital grounds at Ancón, Canal Zone, altitude 20 to 80 meters, flowers, February, 1911, *Pittier* 5737.

This species was distributed as *P. auarcomotemo* Mart., but it belongs rather in series *Parviflorae* of the section *Samanea* on account of its small flowers, straight flat coriaceous pods, and the characters of the inflorescence.

Pithecollobium longepedatum Pittier, sp. nov.

Section *Samanea*. A large deciduous tree, the branchlets brownish-hairy.

Leaves large, soft, terminal, the rachis brownish-hairy, the petioles 5 to 11 cm. long; pinnae 2 to 4-jugate, the small glands inserted a few millimeters

below the pairs of leaflets; leaflets 3 to 7-jugate, the petiolules about 1 mm. long, hairy, the blades broadly ovate or obovate, rounded or subcuneate at the base, broadly obtuse and sometimes subemarginate at the apex, dark green, shiny, and pilosulous above, paler and sparsely hairy beneath, 1.5 to 4 cm. long, 1 to 2.5 cm. broad, the venation prominulous above, less so beneath.

Inflorescences umbellate-capitate, single or geminate in the upper axils, the peduncles 3 to 7 cm. long, brownish-hairy; flowers long-pedicellate, the pedicels about 15 mm. long, slender, hairy; calyx tubular-campanulate, broadly toothed, densely brownish-hairy, about 5.5 mm. long; corolla white, densely hairy, 9 to 9.5 mm. long, the lobes long-triangular, acute, about 3 mm. long; stamen tube included, the stamens pink; pistil about 30 mm. long, the ovary short-stipitate, pubescent.

Legume (immature) straight, hairy, short-stipitate, apiculate, about 15 cm. long and 1.2 cm. broad.

Type in the U. S. National Herbarium, no. 860140, collected at El Coyolar, near Orotina, Costa Rica, at an altitude of 100 to 200 meters, by Carlos Werckle.

I refer also to this species a flowering specimen collected in a garden at Panama City by Brother Celestine (no. 36), November 5, 1912, from a tree which is said to shed its leaves four times a year.

The species is characterized mainly by its general hairiness and the long-pedicellate flowers.

Pithecollobium macradenium Pittier, sp. nov.

Section *Samanea*, series *Carnosae*. A tree, 15 to 20 meters high, the trunk 75 cm. in diameter, the crown rounded-depressed.

Rachis of the leaves minutely pubescent, the petioles 3.5 to 7 cm. long; pinnae usually trijugate, with a very large cupular coriaceous gland between the basal pair; leaflets 5 to 8-jugate, subsessile, with a more or less developed pedicellate gland at the insertion of each pair, the blades inequilateral at the base, rhombic-ovate or ovate, broadly rounded at the apex, glabrous above except for the pubescent costa, paler and more or less pilosulous beneath, 2 to 5 cm. long, 1 to 2.2 cm. broad.

Inflorescences capitate, the peduncles 5 to 6 cm. long, ferruginous-pubescent; flowers small, short-pedicellate, white; pedicels 2.5 mm. long, sparsely puberulous; calyx campanulate, 3.3 to 3.5 mm. long, puberulous, the teeth short, subacute; corolla 6 to 6.5 mm. long, the tube glabrous, the lobes lanceolate-acute, minutely brownish-pubescent; stamen tube included; pistil about 15 mm. long, the ovary short-stipitate, glabrous.

Pod thick, strongly arcuate, compressed, transversely sulcate between the seeds, about 10 cm. long, 2 cm. broad, short-stipitate, the peduncle thick, 5 cm. long.

Type in the U. S. National Herbarium, no. 716482, collected at Monte Lirio, Canal Zone, Panama, May 6, 1912, by E. D. Christopherson (no. 196).

The most remarkable character of this species is the extraordinary development of the gland at the insertion of the basal pinnae. It is often over 1 cm. long, and in its fresh condition forms a deep cup, which is usually visited by ants, according to the collector's notes. The interfoliolar glands, although of ordinary size, also are more developed than is generally the case in the genus.

Pithecollobium chagrense Pittier, sp. nov.

Section *Caulanthon*. A low spreading tree.

Leaves short-petiolate (petioles about 0.5 cm. long); pinnae unijugate, the rachis pubescent or subglabrous, 5 to 12 cm. long; leaflets 3-jugate, more or less alternate, coriaceous, the petiolules pubescent, 2 to 3.5 mm. long, the blades ovate-elliptic or sometimes ovate, cuneate at the base, acute at the apex, 4.5

to 14 cm. long, 2.5 to 5.5 cm. broad, the costa and basal veins very conspicuous on both sides.

Inflorescences spicate, sessile; flowers sessile, pink; calyx minutely pubescent or glabrescent, 1.7 mm. long; corolla glabrous, or penicillate at the tips of the lobes, 6.7 mm. long, the lobes ovate, acute, about 1.2 mm. long; stamen tube exserted; pistil 25 to 30 mm. long, the ovary 1.5 mm. long, brownish-pubescent, the style glabrous, filiform.

Legume flat, thin, slightly arcuate, glabrous, 6 to 12 cm. long, 2.2 cm. broad, the margin thin and distorted.

Type in the U. S. National Herbarium, no. 676943, collected on banks of the Chagres River below Gatún, Canal Zone, Panama, February 17, 1911, by H. Pittier (no. 2808).

Also collected by Fendler (no. 90) at Chagres, near the mouth of the river, February 3, 1850. It was listed under *P. latifolium* Benth., but can not belong to that species, as the inflorescences are spicate.

In this species the leaf venation is very characteristic.

Pithecollobium pilosulum Pittier, sp. nov.

Section *Caulanthon*. A small tree, about 10 meters high, the trunk 40 cm. in diameter; branchlets pilosulous.

Leaves bipinnate, the petioles 0.6 cm. long, the pinnae 1-jugate, the rachis glabrous or pilosulous, 3.5 to 8 cm. long, with interjugal glands between the upper pairs of leaflets; leaflets 3 to 6-jugate, subsessile, ovate to oblong, markedly inequilateral, subacute or sometimes rounded at the base, obtuse and short-apiculate at the apex, dark green above, paler beneath and with prominent venation, the primary and secondary veins more or less pilosulous; leaflets of the basal pair smaller, 2 to 3 cm. long, 1 to 1.5 cm. broad, those of the upper pair larger, 7.8 cm. long, about 3 cm. broad.

Inflorescences ramiflorous, capitulate, pedunculate, the peduncles 1 to 1.5 cm. long; flowers sessile, glabrous, white; calyx 3 to 3.3 mm. long, the teeth broad, acute; corolla 5.5 mm. long, the lobes lanceolate, obtuse, about 2 mm. long; stamen tube long-exserted.

Legume arcuate, depressed, glabrous, short-pedunculate (peduncles about 0.5 cm. long), 5 to 20 cm. long, 1.7 to 2 cm. broad, 3 to 13-seeded, the margins prominent, more or less undulate.

Type in the U. S. National Herbarium, no. 537245, collected at San Martín de Loba and vicinity, Lands of Loba, Department of Bolívar, Colombia, April or May, 1916, by H. M. Curran (no. 88). Also collected at the same place and date by Mr. Curran under his no. 19.

This species differs from all those known in the group *Capitati* of section *Caulanthon* in the larger number of leaflets, the length of the calyx and corolla, and the breadth of the pods.

CAESALPINIACEAE.

A NEWLY REDISCOVERED SPECIES OF BROWNEA.

Brownea leucantha Jacq. Fragm. Bot. Illustr. 26. pl. 29, 21. 1809.

A tree, 15 to 20 meters high, branching from the base, or with an elongate or pyramidal crown, the branchlets grayish, lenticellate.

Leaves large, glabrous, the rachis stout, stiff, 25 to 40 cm. long, glabrous, more or less lenticellate, with a thicker cylindrical basal pulvinus; leaflets 6 to 8-jugate, alternate except the basal and terminal pairs, coriaceous, eglandular, the petiolules stout, canaliculate, about 1 cm. long, the blades inequilateral, ovate to oblong, 6 to 24 cm. long, 3.5 to 6.5 cm. broad, emarginate at the base in the lower pairs, the inner half acute, the outer half rounded at the base in the

upper pairs, all acute or subacuminate at the apex, light green above, paler beneath; costa prominent and primary veins prominulous on both faces, the latter doubly anastomosing along the margin; leaflets of the first pair often cordate-acuminate and deciduous, opposite and inserted at the base of the pulvinus.

Inflorescences axillary on old branchlets, solitary, sessile, forming large white ovoid heads 10 cm. in diameter and more, 15 to 18 cm. long; rachis stout, attenuate, 7 to 9 cm. long, glabrous; bracts numerous, ovate, broadly clasping, brownish-pubescent, the exterior ones up to 8.5 cm. long; pedicels 5 to 7 mm. long, sparsely appressed-hairy; sheath about 4 cm. long, tubular and widened from base to tip, densely brown-pubescent without and within, indistinctly and sparsely costate; receptacle tube long-stipitate, the stipe about 3 cm. long, deeply sulcate, the tube 1.5 cm. long, glabrescent without; sepals 4; petals narrowly oblong-spatulate, 5 to 6 cm. long, glabrous without, sparsely long-hairy within on the blade; pistil about 6 cm. long, the ovary stipitate (stipe about 1 cm. long), densely light brown hairy, the style glabrous, slender.

Legumes 20 to 25 cm. long, 3.5 to 4.5 cm. long, 2 or 3 to each flower head, the peduncles 4 to 4.5 cm. long, glabrous, the stipe tetragonous, 1 to 2 cm. long, the whole body compressed, rufous-pubescent, the dorsal margin thin, the ventral one dilated, 5 to 6 mm. broad, bisulcate, the apex curved, acute, beaklike; seeds uniform, depressed, suborbicular, 2.7 to 3 cm. in diameter, about 8 mm. thick, finely rugose on the faces, bordered around the margin by the omphalodic band.

Type from near Caracas, Venezuela; the above description from specimens collected in the forests of Mararé, near Ocumare del Tuy, State of Miranda, Venezuela, with flowers and fruits, May 1, 1918, by H. Pittier (no. 7804).

This beautiful species, known only from Venezuela, does not seem to have been reported again since its discovery by Jacquin's collector (Bredemeyer?). It does not appear to exist any longer in the vicinity of Caracas, probably because the forests have largely disappeared, but I found it very abundant and characteristic in the forests and gorges above Ocumare, in the mountains between the northern part of the country and the llanos.

FABACEAE.

THE MIDDLE AMERICAN SPECIES OF *MACHAERUM*.

KEY TO SPECIES.

Leaflets few (15 or less), medium-sized to large (mostly above 5 cm. long), acuminate, the veins remote, with the interspaces densely reticulate.

RETICULATA.

Leaves 11 to 15-foliolate; leaflets thick, ovate, acutely acuminate. Inflorescence sparsely flowered; flowers large; legume 9 to 10 cm. long, ferruginous-tomentose at the base. Panama-----1. *M. pachyphyllum*.

Leaves 3 to 11-foliolate; leaflets submembranous, elliptic or oblong, or ovate and then very large and few, obtusely acuminate.

Legume 10 to 11.5 cm. long; leaves 3 or 5-foliolate; leaflets ovate, long-acuminate, 6 to 14.5 cm. long, 3 to 8 cm. broad. Central America and Mexico-----2. *M. latifolium*.

Legume not over 6 cm. long; leaves 7 to 11-foliolate; leaflets shortly broad-acuminate, not over 8 cm. long.

Petiolules 4 to 5 mm. long; filaments glabrous; legume rather long-stipitate (the stipe 7 mm. long), ferruginous-pubescent at the base; leaflets 7.5 to 8 cm. long, 2 to 3.5 cm. broad. Panama.

3. *M. darienense*.

Petioliules 2 mm. long; filaments villous; legume short-stipitate (stipe 4 to 5 mm. long), at first minutely pubescent; leaflets 7 to 11, 1.5 to 5 cm. long, 0.7 to 2 cm. broad. Costa Rica, Panama, Colombia.

4. *M. seemanni*.

Leaflets numerous (13 and over, or fewer but then broadly rounded or emarginate at the apex), small to medium-sized (mostly less than 7 cm. long), rounded, obtuse, or emarginate at the apex, the veins close together, with the interspaces hardly or not at all reticulate.

Leaflets small (not over 1.5 cm. long), numerous, glabrous, the primary veins very close, parallel, not anastomosing. LINEATA.

Legume glabrous, the seminal part torulose; leaflets 25 to 45; rachis of the leaves hairy on the dorsal side only; stipules glabrous. Panama.

5. *M. glabripes*.

Legume densely golden-setulose, the seminal part broad and flat; leaflets 41 to 65; rachis ferruginous-tomentellous all over; stipules ferruginous-hairy at first. Panama-----

6. *M. cirrhiferum*.

Leaflets usually medium-sized (1 to 7 cm. long), rarely very small (4 to 8 mm. long), glabrous or hairy, the primary veins not very close together, sparsely but distinctly anastomosing. OBLONGA.

Leaflets 31 to 61, 4 to 8 mm. long; stipules scarious or sometimes indurate, densely ferruginous-pubescent; seminal part of the pod yellowish-villous. Panama-----

7. *M. arborescens*.

Leaflets usually less numerous and larger (1 to 7 cm. long); stipules indurate-spinescent, hairy or glabrous, sometimes caducous.

Leaflets ovate-oblong or obovate, obtuse or emarginate at the apex, glabrous, at least on the upper face.

Leaflets obovate, deeply emarginate at the apex, entirely glabrous.

Pod long-stipitate, the seminal part minutely pubescent. Mexico.

8. *M. acanthothyrsus*.

Leaflets ovate-oblong, obtuse or retuse at the apex, more or less hairy on the lower face.

Plant an unarmed tree; rachis of the inflorescence ferruginous-pubescent; flowers 12 to 13 mm. long, violet; seminal part of the pod broad and thick, more or less setulose. Mexico.

9. *M. langlassei*.

Plant a trailing armed shrub; rachis of the inflorescence more or less tomentose; flowers 6 to 7 mm. long, dark purple; pods glabrous at maturity. Panama-----

10. *M. purpurascens*.

Leaflets oblong, rounded or subacute at the apex, more or less hairy on both faces.

Inflorescences very large (up to 40 cm. long), the rachis glabrous or sparsely hairy. Leaflets 41 to 55, very narrow (5 to 8 mm. broad), villous-tomentose on both faces. Costa Rica.

11. *M. costaricanum*.

Inflorescences not over 30 cm. long, the rachis densely hairy, sometimes setulose.

Leaflets 13 to 19, obtuse or subacute and mucronulate at the apex, puberulous above, tomentellous beneath; flowers 12 to 13 mm. long. Guatemala-----

12. *M. cobanense*.

Leaflets 31 to 41, rounded or more or less emarginate at the apex, villosulous on both sides; flowers 9 to 10 mm. long. Mexico;

Guatemala-----

13. *M. setulosum*.

DESCRIPTION OF SPECIES.

1. *Machaerium pachyphyllum* Pittier, sp. nov.

"A spreading tree, about 7 meters high, with a trunk 17.5 cm. in diameter," or "a shrub, with a stem up to 10 cm. in diameter, trailing on trees," the older stems covered with a gray glabrous bark, the younger stems densely setose-aculeate, the shoots ferruginous-tomentose.

Leaves 11 to 15-foliolate, the rachis 12 to 23 cm. long, subangular, at first densely ferruginous-tomentose, later glabrous; leaflets coriaceous, the petioles ferruginous-hairy or glabrous, subcanaliculate, 4 to 6 mm. long, the blades ovate or ovate-oblong, rounded at the base, abruptly short-acuminate at the apex, 3.5 to 9.5 cm. long, 1.8 to 4 cm. broad, glabrous, or the costa densely ferruginous-hairy beneath, strongly reticulate on both faces, more or less lustrous on the upper one; stipules caducous, ovate, subacuminate, about 1 cm. long, scarious or subindurate, filmy-tomentose on both sides.

Inflorescences axillary or terminal, often growing from defoliate nodes on the old wood, long and broadly paniculate, twice ramified, brownish-tomentose, the main rachis 14 to 60 cm. long, the primary branchlets (often geminate) up to 9 cm. long; peduncles 3 to 10-flowered, 3 to 5 cm. long; bracts and bractlets caducous; pedicels 3 to 5 mm. long, densely brownish-hairy; flowers about 15 mm. long; bractlets orbicular, obtuse or subtruncate at the apex, 5.5 mm. long and broad, brownish-tomentose without; calyx campanulate, about 8 mm. long, densely brownish-tomentose without, the teeth subacute, almost equal in length; petals purplish; standard reflexed, densely brownish-pubescent without, glabrous within, the claw about 1.5 mm. long, the blade orbicular, rounded at the base, emarginate at the apex, 12 mm. long, 14.5 mm. broad; wings glabrous, subfalcate, oblique, the claw about 3 mm. long, the blade 1-auriculate, obovate, rounded at the apex, 11 to 11.5 mm. long, 5 to 5.5 mm. broad; carinal petals glabrous, 1-auriculate, strongly falcate, the claw 3 to 3.5 mm. long, the blade about 11 mm. long, 3.5 mm. broad; stamens monadelphous, glabrous, the anthers subglobose; ovary 1-ovulate, short, stipitate, densely villous, provided at the base with a tubular glabrous disk nearly 2 mm. long; style filiform, about 5.5 mm. long.

Legume 9 to 10 cm. long, stipitate, the stipe about 11 mm. long, the seminal part 2.5 cm. long and 1.2 cm. broad, more or less ferruginous-tomentose, the wing cultriform, glabrous, reticulate-veined, 2 cm. broad, subobtusate at the apex.

Type in the U. S. National Herbarium, no. 677922, collected in the vicinity of Penonomé, Province of Coclé, Panama, in flower, February or March, 1908, by R. S. Williams (no. 107). The description of the fruit is from specimens in the herbarium of the New York Botanical Garden, obtained at the same locality and date (*Williams* 397.)

The type specimen is said to have been obtained from a tree, and the fruiting specimens, accompanied also by flowers, to have come from a trailing shrub. We are thus led to believe that this species varies in habit according to environment, and the same apparent contradiction in regard to other species of the genus leads to a like conclusion as to this dimorphism. I have myself never noticed a pronounced diversity in the habit of *Machaerium* species, but I have in Panama often found *Clitoria arborescens* Ait. growing in cleared places as a low, erect shrub, while in the forest it was decidedly a trailer, with long vinelike stems.

While *Machaerium pachyphyllum* is easily recognized as a member of the section *Reticulata* Benth., its nearer affinities are not easy to determine. It is characterized by its thick leaflets, variable indument, and very large flowers and pods.

2. *Machaerium latifolium* (Benth.) Pittier.

Machaerium acuminatum latifolium Benth. Journ. Linn. Soc. Bot. 4: Suppl. 65. 1860.

A tree; branchlets terete, glabrous, sparsely verruculose.

Leaves 3, 4, or 5-foliolate, glabrous, turning blackish in drying, the rachis terete, thick at the base, 9 to 15 cm. long; leaflets subcoriaceous, the petiolules canaliculate, black, 4 to 5 mm. long, the blades ovate, rounded or broadly cuneate at the base, abruptly and narrowly long-acuminate at the apex (the acumen often 2.5 cm. long), 6 to 14.5 cm. long, 3 to 8 cm. broad, paler on the lower face, densely reticulate-veined; stipules caducous, wanting.

Inflorescences racemose, axillary, simple, the rachis glabrous, 2 to 5 cm. long; bractlets persistent, small, broader than long, concave; flowers sessile, their structure not known.

Legume 10 to 11.5 cm. long, stipitate (the stipe minutely pubescent, 4 to 8 mm. long), the seminal part straight, at first pubescent, later glabrous, about 3 cm. long and 2 cm. broad, the blade cultriform, obtuse, 2.5 to 3 cm. broad; seed ovate-scutellate, depressed, about 1.5 cm. long, 2 to 2.5 cm. broad, attenuate toward the base of the pod, broadly obtuse at the other end, with a narrow notch on the carinal margin, this corresponding with the insertion of the hilum.

The description is drawn from specimens collected in the forests of Santo Domingo de Osa, Costa Rica, in fruit, March, 1896, by A. Tonduz (Inst. Fís. Geogr. Costa Rica, no. 10069). The same species has been reported from Nicaragua (*Oersted*), Jalapa, Mexico (*Galeotti*), and Mount Orizaba, Mexico (*Botteri* 1031).

Bentham considered this only a variety of *Machaerium acuminatum*, a conclusion in which I can not concur, for the leaves and fruits are constantly larger, and the leaflets of different shape. The flowers will probably furnish good differential characters. These two species, with *M. brasiliense*, form a distinct group of closely related species.

3. *Machaerium darienense* Pittier, sp. nov.

A small unarmed tree; branchlets terete, lenticellate, glabrous (in the fruiting specimens).

Leaves 7-foliolate, the rachis slender, subterete, 6 to 10 cm. long, minutely grayish-pubescent; leaflets subcoriaceous, the petiolules terete, glabrous, 4 to 5 mm. long, the blades ovate or oblong, broadly cuneate or rounded at the base, obtusely acuminate at the apex, 5 to 8 cm. long, 2 to 3.5 cm. broad, glabrous and prominulous-reticulate above, prominulous-reticulate and sparsely grayish-pubescent along the costa beneath; stipules not seen.

Inflorescences axillary or terminal, the rachis fuscous-pubescent, 3 to 7 cm. long, simple or ramified; bractlets persistent, pubescent, cucullate; flowers sessile; bractlets pubescent, about 1.5 mm. long and much broader; calyx about 3 mm. long, sparsely pubescent, striate; standard minutely grayish-pubescent without; filaments glabrous; anthers ovoid-globose; other details of the flower not known.

Legume 5 to 5.5 cm. long, long-stipitate (the stipe about 7 mm. long), ferruginous-pubescent, the seminal part straight, about 2 cm. long, 1 cm. broad, the wing cultriform, rounded, mucronulate, 1.4 cm. broad; seed oblong, compressed, rounded-obtuse at both ends, about 7 mm. long, 14 mm. broad.

Type in the U. S. National Herbarium, no. 715743, collected in the vicinity of La Palma, southern Darién, Panama, in fruit, January 26, 1912, by H. Pittier (no. 5497).

The present species belongs to the group of *Machaerium seemanni*, on account of its sessile flowers and other characters, but it differs in its pubescence, the number, shape, and size of its leaflets, and its rather long-stipitate and broader pods.

4. *Machaerium seemanni* Benth. in Seem. Bot. Voy. Herald 110. 1853.

Machaerium campylocarpum Donn. Smith, Bot. Gaz. 44: 109. 1907.

An unarmed spreading shrub; branchlets terete, striate, at first ferruginous-pubescent.

Leaves 7 to 11-foliolate, the rachis slender, 5.5 to 9 cm. long, terete, sparsely ferruginous-hairy; leaflets coriaceous, the petiolules about 2 mm. long, ferruginous-hairy, the blades ovate or ovate-lanceolate, rounded or subemarginate at the base, short-obtuse or acute-acuminate at the apex, 1.5 to 5 cm. long, 0.7 to 2 cm. broad, glabrous, lustrous and dark green above, paler beneath, more or less villous or pilosulous, especially along the costa, and finely reticulate; stipules caducous, wanting.

Inflorescences axillary or terminal, racemose, the rachis (or peduncle) not over 2 cm. long, ferruginous-pubescent; bracts and bractlets persistent, shorter than broad, truncate, conchoid, minutely pubescent; flowers sessile, about 7 mm. long; bractlets suborbicular (broader than long), ferruginous-pubescent, 1 to 1.5 mm. long; calyx persistent, campanulate, 3 to 3.5 mm. long, densely ferruginous-hairy, the teeth inconspicuous; petals persistent, purple; standard orbicular, ferruginous-sericeous, the claw very short, the blade orbicular, subemarginate at the base, bilobulate at the apex, about 5.5 mm. long and 7 mm. broad; wings elongate, the claw 1.5 to 2 mm. long, the blade auriculate, obovate, densely villous-barbate without, 5.5 mm. long, 2.3 mm. broad; carinal petals falcate, the claw as in the wings, the blade broad, straight on the vexillar margin, densely villous-barbate on the carinal half without, about 5 mm. long and 3 mm. broad; stamens monadelphous, the filaments villous; ovary pubescent, 1-ovulate.

Legume 5 to 6 cm. long, short-stipitate (the stipe 4 to 5 mm. long), at first minutely pubescent, the seminal part arcuate, 2 cm. long and 7 to 9 mm. broad, the wing obtuse or subacute, 1.5 to 1.7 cm. broad, the vexillar margin thin and arcuate, the carinal margin almost straight and thick.

Type from El Boquete de Chiriquí, Panama (*Seemann* 1681).

SPECIMENS EXAMINED:

COLOMBIA: Foothills of Santa Marta, altitude about 700 meters, flowers, June, 1900, *Herbert H. Smith* 2038.

PANAMA: Arid hills near Las Cruces de Churué, between Aguadulce and Olá, Province of Coclé, fruits, December 9, 1911, *Pittier* 5094. Cerro Vaca, eastern Chiriquí, altitude 900 meters, fruits, December 26, 1911, *Pittier* 5310.

COSTA RICA: Hacienda Jiménez, Peñas Blancas, Diquís Valley, altitude 600 meters, flowers and fruits, February 7, 1898, *Pittier* (Inst. Fís. Geogr. Costa Rica, no. 12163).

The first diagnosis of this species, described from Chiriquí, does not mention the fruit. In his Synopsis of Dalbergiae, published seven years later, Bentham completed his first description with that of a pod of a Venezuelan specimen, *Fendler* 1685, representing a very closely related but certainly distinct species. This resulted in Capt. John Donnell Smith's redescribing the shrub as a new species. My specimens from Panama agree perfectly with the original diagnosis and I have been able to convince myself by direct comparison that they are absolutely identical with the type of *Machaerium campylocarpum* Donn. Smith.

5. *Machaerium glabripes* Pittier, sp. nov.

A small armed tree, about 6 meters high, with a trunk 10 cm. in diameter at the base; young branchlets subangular, minutely pubescent, sparsely lenticellate.

Leaves 25 to 45-foliolate, the rachis slender, canaliculate, 4 to 7 cm. long, hairy on the dorsal side only; leaflets coriaceous, glabrous, the petiolules distinct but less than 0.5 mm. long, the blades oblong, rounded or subcuneate at the base, rounded or truncate and submucronate at the apex, 3 to 10 mm. long, 1.5 to 3 mm. broad, dark green above, paler beneath, the veins numerous, parallel, not anastomosing, running into the marginal nerve; stipules of the older branchlets indurate-spinescent, slender, acute, about 5 mm. long, those on the new branchlets ovate-acuminate, scarious, glabrous.

Flowers not known.

Legume 4.5 to 5 cm. long, glabrous, long-stipitate (stipe pubescent, about 8 mm. long), the pedicel ferruginous-pubescent, 3 to 4 mm. long, the seminal part dark brown, torulose and striate or verruculose, sharply bent, the wing membranous, cultriform, more or less obtuse, apiculate, 1.3 to 1.5 cm. broad.

Type in the U. S. National Herbarium, no. 678107, collected in fruit only in the vicinity of Penonomé, Province of Coclé, Panama, March, 1908, by R. S. Williams (no. 410).

The specimens agree with the description of the leaves and general characters of *M. glabratum*, except as to the size of the leaves, but without having seen the flowers of the Panama tree it is impossible to determine exactly its relationship to the Colombian plant.

6. *Machaerium cirriferum* Pittier, sp. nov.

A trailing armed shrub, the stems 2.5 to 5 cm. in diameter; branchlets often spirally twisted, at first densely ferruginous-pubescent.

Leaves 41 to 65-foliolate, the rachis slender, 7 to 16 cm. long, canaliculate, ferruginous-tomentellose; leaflets subcoriaceous, glabrous, the petiolules 0.5 mm. long or less, the blades oblong, rounded at the base, rounded and slightly emarginate at the apex, 4 to 15 mm. long, 3 to 6 mm. broad, pale beneath, the veins sinuous, numerous, more or less anastomosing, running into the marginal nerve; stipules indurate-spinescent, short, stout, arcuate, at first ferruginous-hairy.

Inflorescences terminal, up to 40 cm. long, broad, the rachis densely ferruginous-pubescent; bracts stipule-like; peduncles few-flowered; pedicels stout, 3 mm. long, densely ferruginous-hairy; bractlets large, suborbicular, striate, ferruginous-pubescent; calyx campanulate, about 5 mm. long, ferruginous-tomentellose; standard grayish-pubescent without.

Legume 4 to 5.5 cm. long, not stipitate, the seminal part 1.5 cm. long and about 1 cm. broad, densely golden-setose, the wing cultriform, rounded at the apex, 1.5 to 1.8 cm. broad, sparsely tomentose.

Type in the U. S. National Herbarium, no. 678111, collected in the vicinity of Penonomé, Province of Coclé, Panama, in fruit, March, 1908, by R. S. Williams (no. 416).

This species is well characterized by its tendril-like branchlets and by having the fruit almost sessile and covered with a golden-yellow indument.

7. *Machaerium arborescens* Pittier, sp. nov.

A tree about 12 meters high, the trunk 10 cm. in diameter; branchlets stout, grayish, more or less lenticellate, at first densely grayish-tomentose.

Leaves 31 to 61-foliolate, more or less fasciculate at the ends of the short branchlets, the rachis slender, 2.5 to 8.5 cm. long, densely ferruginous-pubescent; leaflets membranous, inequilateral, the petiolules hairy, not over 0.5 mm. long,

the blades oblong, rounded at the base, obtuse or slightly emarginate at the apex, 4 to 8 mm. long, 1 to 3 mm. broad, villous at the base above, paler and sparsely villous all over beneath, the veins distant, distinctly anastomosing, running into the marginal nerve; stipules mostly scarious, sometimes indurate, lanceolate-acuminate, densely ferruginous-pubescent without, caducous or subpersistent.

Inflorescences axillary, 5 to 15 cm. long, subpaniculate or the peduncles inserted directly on the main rachis; rachis densely ferruginous-tomentose; peduncles 3 to 10-flowered; bracts stipule-like; pedicels 3 to 5 mm. long; bractlets orbicular, about 4 mm. long and broad; calyx campanulate, about 7 mm. long, densely ferruginous-hairy; standard densely grayish-hairy without.

Legume 5 to 5.5 cm. long, not stipitate, the seminal part 1.5 cm. long and 1.3 cm. broad, densely villous-tomentose with brown and yellow hairs, the wing obovate, subcultriform, more or less villous or pilosulous, about 1.8 cm. broad.

Type in U. S. National Herbarium, no. 678106, collected near Penonomé, Province of Coclé, Panamá, March, 1908, by R. S. Williams (no. 409).

This species belongs to the section *Oblonga*, but its affinities are doubtful and are difficult to determine in the absence of flowers.

8. *Machaerium acanthothyrsus* Pittier, sp. nov.

A tree (?); branchlets terete, glabrous.

Leaves 9-foliate, the rachis glabrous, subterete, 5 to 10 cm. long; leaflets coriaceous, subopposite, the petiolules 1 to 2 mm. long, glabrous or pilosulous, the blades broadly ovate or (in the terminal leaflet) obovate, rounded or (in the terminal leaflet) cuneate at the base, broadly rounded, emarginate, and distinctly mucronulate at the apex, 2 to 5.5 cm. long, 1 to 2.5 cm. broad, glabrous, paler beneath, the veins numerous, parallel, profusely anastomosing; stipules indurate-spinescent, lanceolate, acute, recurved, glabrous, up to 5 mm. long.

Inflorescence terminal, paniculate, up to 30 cm. long, the rachis (in the fructiferous panicle) glabrous; peduncles (branchlets of second order) short, ferruginous-pubescent, few-flowered; pedicels ferruginous-pubescent, 3 to 4 mm. long; bracts conspicuous, indurate-spinescent, straight or more or less pubescent at the base, smooth and sharp-pointed at the apex, up to 4.5 mm. long; bractlets caducous, not seen; calyx persistent, tubular-campanulate, about 4 mm. long, ferruginous-pubescent; other details of the flower not known.

Legume 6 to 7.5 cm. long, long-stipitate (the stipe 8 to 9 mm. long, pubescent), the seminal part 2 to 2.5 cm. long, 0.9 cm. broad, curved, tuberculate over the seed, sparsely pubescent, the wing membranous, cultriform, obtuse, reticulate, 12 to 15 mm. broad.

Type in the U. S. National Herbarium, no. 1,059,397, collected on the road between Hacienda del Capricho, Guerrero, and Llano Grande, Oaxaca, Mexico, altitude 65 to 100 meters, February 16, 1895, by E. W. Nelson (no. 2331).

Very closely related to *Machaerium langlassei* Micheli, collected in the same region, but differing in indument, number and shape of leaflets, and rather profusely aculeate panicle. If the fruit specimen described for the latter species has been correctly identified, other differential characters may be found in the fruits.

9. *Machaerium langlassei* Micheli, sp. nov.

An unarmed tree, 5 to 12 meters high, with rounded crown; branchlets terete, at first densely ferruginous-pubescent.

Leaves 13 to 21-foliate, the rachis 10 to 18 cm. long, angular or subterete, at first densely ferruginous-pubescent, later glabrous or glabrescent; leaflets coriaceous, the petiolules 2 to 3 mm. long, pubescent, the blades oblong,

rounded or acuminate at the base, rounded and slightly retuse at the apex, 2 to 7 cm. long, 1.3 to 2.3 cm. broad, glabrous and dark green above, paler beneath and more or less villous, especially along the costa, the veins crowded, parallel, running into the marginal nerve, more or less anastomosing through intermediate veinlets; stipules caducous, wanting.

Inflorescence paniculate, axillary or terminal, 15 to 25 cm. long, simply branched, longer than the leaves, the rachis densely ferruginous-pubescent; peduncles solitary or 2 or 3-fasciculate, sometimes branched, cymose, 3 to 13-flowered, 2 to 6 cm. long; bracts and bractlets caducous, not seen; pedicels densely ferruginous-pubescent, 2 to 3 mm. long; flowers 12 to 13 mm. long; bractlets suborbicular, 2.5 to 3.5 mm. long and broad, ferruginous-pubescent without; calyx campanulate, 5 to 6 mm. long, densely ferruginous-pubescent, the teeth obtuse or subacute, the carinal tooth longer and narrower; petals violet; standard pubescent (more so toward the base) without, the claw short (about 1 mm. long), the blade suborbicular or obovate, attenuate-acute at the base, slightly emarginate at the apex, with rounded unequal lobes, about 11.5 mm. long, 11 mm. broad; wings strongly falcate-arcuate, glabrous, the claw 3 mm. long, the blade about 12 mm. long, 3.5 to 4 mm. broad; carinal petals strongly arcuate, glabrous, auriculate on the vexillar side, subacute at the apex, the claw 2 to 2.5 mm. long, the blade about 11 mm. long, 3.5 to 4 mm. broad; stamens monadelphous, glabrous, the anthers ovate, attenuate to the apex; ovary stipitate, densely grayish-villous, 1-ovulate, strongly arcuate, provided at the base with a glabrous tubular disk, 1.5 to 2 mm. long; style articulate and sparsely villous at the base, nearly 4.5 mm. long, perpendicular to the stipe.

Legume 6 to 7 cm. long, stipitate, the stipe and seminal part ferruginous-hairy and more or less setose, the former about 7 mm. long, the latter brown, 2 cm. long, 1 cm. broad, arcuate toward the apex, the wing cultriform, obtuse, sparsely hairy or glabrescent, 4 cm. long 1.7 cm. broad; seed brown, reniform, about 6 mm. long, 13 mm. broad.

Type in the Gray Herbarium, collected at Cerro Pedregoso and El Ocote, Guerrero, Mexico, altitude 300 meters, in flower, October 28, 1898, by E. Langlassé (no. 526). The description of the fruit is from specimens collected at El Rancho, Department of Jalapa, Guatemala, January 23, 1908, by W. A. Kellerman (no. 5599).

Collected also in the neighborhood of Alajuelita, near San José, Costa Rica, in flower, September, 1890, by A. Tonduz (Inst. Ffs. Geogr. Costa Rica, no. 3000).

This species, which is apparently widely spread over the semiarid districts of southern Mexico and Central America, escaped the attention of the earlier collectors. The Costa Rican specimens were identified by Micheli as *M. moritzianum* Benth. (a very distinct species), an identification which was followed by Capt. John Donnell Smith in his determination of the Guatemalan tree.

10. *Machaerium purpurascens* Pittier, sp. nov.

An armed, trailing or scandent shrub, the stems about 5 cm. in diameter, 3 to 4 meters long; branchlets terete, purplish brown, striate, at first brownish-hairy, later glabrous.

Leaves distichous, 17 to 27-foliolate, the rachis 7 to 12 cm. long, slender, more or less grayish or brown-tomentose; leaflets subcoriaceous, the petiolules hairy, not over 1 mm. long, the blades ovate-oblong or obovate, slightly inequilateral, rounded or (in the terminal leaflet) cuneate at the base, more or less obtuse and mucronulate at the apex, 1 to 4 cm. long, 0.4 cm. broad, glabrous, dark green and punctulate above, paler beneath, punctulate, and more or

less villous, the veins distant, anastomosing, inconspicuous; stipules triangular-acute, 4 to 5 mm. long, at first scarious and villous-tomentose, later indurate-spinescent, arcuate, glabrous.

Inflorescences paniculate, axillary or terminal, up to 15 cm. long, the rachis terete, 3 times ramified; branchlets of the first order brownish-pubescent or sometimes densely canescent-tomentose, the others densely villous-tomentose; bracts of the first order more or less indurate and glabrescent, those at the base of the peduncles broadly triangular, acute, scarious, densely villous without, glabrous inside; peduncles (branchlets of the third order) 5 to 12-flowered, sometimes ramified, 1 to 2 cm. long; flowers 6.5 to 7 mm. long, the pedicels hairy, up to 2 mm. long, subtended at the base by a minute persistent bractlet; bractlets suborbicular, glabrous or sparsely pilosulous, about 1 mm. long, 1.5 mm. broad, persistent; calyx persistent, campanulate, 3.5 mm. long, purple, glabrous or more or less puberulous on the margin, the teeth subequal, subacute, the vexillar ones broader; petals pinkish purple; standard reflexed, densely brownish-pubescent without, the claw about 1 mm. long, the blade suborbicular (shorter than broad), broadly truncate or subemarginate at the base, deeply emarginate at the apex (the lobes broadly rounded), 4 to 5.5 mm. long, 7 to 8 mm. broad; wings broadly obovate, glabrous, the claw arcuate, about 2 mm. long, the blade oblique, auriculate on the vexillar side at the base, broadly obtuse, about 4.5 mm. long, 3.5 mm. broad, the carinal margin reflexed; carinal petals falcate, glabrous, the claw as in the wings, the blade auriculate on the vexillar side at the base, subacute at the apex, about 4.5 mm. long, 2.5 mm. broad; stamens monadelphous, glabrous, the filaments arcuate; ovary 1-ovulate, stipitate (without basal disk), densely villous-tomentose, the style slender, straight, glabrous.

Fruits yellowish green or purplish, at first ferruginous-pubescent, glabrous when fully ripe, short-stipitate, 4.5 to 5 cm. long, the seminal part about 8 mm. broad, the wing cultriform, rounded-obtuse and apiculate at the apex, up to 12 mm. broad.

Type in the U. S. National Herbarium, no. 676886, collected at Ancón, Canal Zone, Panama, in flower, February 14, 1911, by H. Pittier (no. 2749).

The following additional specimens may be cited:

PANAMA: Open slopes of old French cut near Bohio, Canal Zone, immature flowers, February 12, 1911, *Maxon* 4783. Vicinity of Penonomé, Province of Coclé, immature fruits, February or March, 1908, *Williams* 112, 413, 414, 415. Vicinity of La Palma, southern Darién, flowers, January 26, 1914, *Pittier* 5495. Panama, flowers, March, 1847, *Seemann* 465.

This is probably the species collected in Panama by Hayes (no. 328), Sinclair, and Hinds, and identified as *M. angustifolium*. It belongs, however, to the section *Oblonga* and differs from that species in the general purplish coloration of the branchlets, flowers, and fruits, in the number, size, and shape of the leaflets, and in the peculiar shape of the standard and wings.

11. *Machaerium costaricanum* Pittier, sp. nov.

An armed shrub (or a small tree?); branchlets subangular, at first pilosulous, later glabrous.

Leaves 41 to 55-foliolate, the rachis 18 to 25 cm. long, slender, densely ferruginous-hairy; leaflets membranous, the petiolules hairy, about 1 mm. long, the blades narrowly oblong, rounded at the base, rounded or slightly emarginate at the apex, 2 to 3.5 cm. long, 5 to 8 mm. broad, more or less villous-tomentose on both faces, the veins numerous, parallel, sparsely anastomosing, running into the marginal nerve; stipules indurate-spinescent, slender, sharp, about 8 mm. long.

Inflorescences paniculate, terminal, very large (up to 40 cm. long), the main rachis thick, glabrous, sparsely lenticellate, the branchlets up to 25 cm. long, sparsely hairy; peduncles (branchlets of the second order) geminate, ferruginous-hairy, 4 to 8-flowered, 1.5 to 3 cm. long; bracts and bractlets scarious, lanceolate, pilosulous, early deciduous; pedicels hairy, 1.5 to 2 mm. long; flowers about 9 mm. long; bractlets ovate, obtuse or subacute, glabrous or pilosulous, 3 to 3.5 mm. long, 2 to 2.5 mm. broad; calyx campanulate, 5.5 to 6.5 mm. long, purple, glabrous or sparsely villous on the margin, the carinal tooth longer, rounded, the vexillar teeth also rounded, broader and irregular; petals purple; standard reflexed, densely gray-villous without, the claw oblique, about 1.5 mm. long, the blade ovate-oblong, rounded and broader at the base, emarginate with rounded lobes at the apex, about 10.5 mm. long, 9 mm. broad; wings long and narrow, glabrous, the claw about 2.5 mm. long, the blade oblique-oblong, arcuate, 1 or 2-auriculate at the base, 8 to 9.5 mm. long, 3 mm. broad; carinal petals strongly arcuate, glabrous, 1-auriculate, the claw as in the wings, the blade about 9 mm. long and 2.5 to 3 mm. broad; stamens monadelphous, glabrous, the filaments thicker than the oblong anthers; ovary 1-ovulate, stipitate, strongly arcuate, densely grayish villous-tomentose, provided at the base with a glabrous tubular disk; style very short (about 0.7 mm. long), glabrous.

Fruit wanting.

Type in the John Donnell Smith Herbarium, collected in forest along Río Ceibo, near Buenos Aires, Diquís Basin, Costa Rica, altitude about 300 meters, flowers, February, 1891, by A. Tonduz (Inst. Ffs. Geogr. Costa Rica, no. 3816).

Determined as *Machaerium lanatum* Tulasne by Micheli, but differing in the number and venation of the leaflets, the general indument, the pedicellate flowers, and the size of the panicles. It is related to *M. purpurascens*.

12. *Machaerium cobanense* Donn. Smith, Bot. Gaz. 44:108. 1907.

A trailing armed shrub, the stems up to 10 meters long; branchlets terete, lenticellate, at first grayish-tomentose.

Leaves 13 to 19-foliolate, the rachis slender, 9 to 15 cm. long, tomentulose; leaflets coriaceous, the petiolules brownish-hairy, 1 to 2 mm. long, the blades oblong, rounded or subacute at the base, obtuse or subacute and mucronulate at the apex, 1 to 5.5 mm. long, 0.4 to 2.5 cm. broad, dark green and more or less puberulous above, paler and tomentulose beneath, the veins more or less straight, anastomosing and running into the marginal nerve; stipules indurate-spinous, recurved, acute, up to about 5 mm. long, caducous.

Inflorescences terminal, paniculate, up to 30 cm. long, the rachis densely yellowish-hairy; peduncles (branchlets of the second order) usually simple, 3 to 5-flowered; bracts stipule-like, caducous; bractlets not seen; pedicels hairy, 1 to 3.5 mm. long; flowers 12 to 13 mm. long; bractlets orbicular, yellowish-hairy, 2 to 2.5 mm. long, 3 mm. broad; calyx tubular-campanulate, about 6 mm. long, hairy, the 3 lower teeth narrow and subacute, the 2 vexillar ones very broad and short; petals purplish; standard densely gray-pubescent without, the claw broad, 1.5 to 2 mm. long, the blade suborbicular, more or less attenuate at the base, broadly rounded and emarginate at the apex, about 7.5 mm. long, 8.5 to 9 mm. broad; wings obovate, oblique, not auriculate, glabrous, the claw 2.5 to 3 mm. long, the blade obtuse, 7 mm. long, 4 mm. broad; carinal petals slightly falcate, auriculate, glabrous, the claw 3 mm. long, the blade about 5 mm. long and 3 mm. broad; stamens monadelphous, glabrous, the anthers ovoid; ovary 1-ovulate, straight, stipitate, villous, provided at the base with a short tubular disk; style glabrous, incurved, about 0.8 mm. long.

Fruit not known.

Type in the John Donnell Smith Herbarium, collected near Cobán, Alta Verapaz, Guatemala, in flower, August, 1906, by H. von Türckheim (no. II. 1401).

Placed by Captain Smith in the section *Reticulata*, but evidently a species of the *Oblonga* group, near *M. purpurascens* Pittier, from which it differs by the larger flowers and the pubescence, and in other minor characters.

13. *Machaerium setulosum* Pittier, sp. nov.

An armed scandent shrub; branchlets terete, striate, glabrous or more or less villous or pubescent.

Leaves 31 to 49-foliolate, the rachis 12 to 24 cm. long, tapering from the base, more or less villous or puberulous; leaflets subcoriaceous, the petiolules reddish, pubescent, 0.5 to 1.5 mm. long, the blades oblong, slightly inequilateral, rounded at the base, rounded and more or less emarginate at the apex, 2.5 to 4 cm. long, 7 to 13 mm. broad, minutely pubescent, villosulous or glabrous above, paler and villosulous (principally along the costa) beneath, the veins numerous, more or less parallel, anastomosing but running into the marginal nerve; stipules indurate-spinescent, acute-lanceolate, often 1 cm. long, at first subscariosus and hairy, sometimes early deciduous.

Inflorescences paniculate, terminal, 15 to 30 cm. long, the main rachis thick, villous or glabrescent, the branchlets densely hairy, the peduncles (branchlets of the second order) grayish-setulose and hairy, 2 to 3-fasciculate, often branched, 5 to 10-flowered, 2 to 7 cm. long; bracts of the first order deciduous, scariosus, broadly lanceolate-subulate, more or less villous, striate, provided at the base with a bunch of bright yellow bristles; bracts of the second order scaly, clasping, hairy, early deciduous; bractlets very small, hairy; pedicels 2 to 5 mm. long, hairy, setulose at the apex; flowers 9.5 to 10 mm. long; bractlets ovate, concave, about 3.5 mm. long, 3 mm. broad, striate and setulose without; calyx persistent, campanulate, about 5 mm. long, purple, sparsely setulose without, the teeth rounded (the carinal one longer, the vexillar ones very broad and irregular); petals pinkish purple; standard reflexed, densely silky-pubescent without, the claw oblique, 1.5 or 2 mm. long, the blade orbicular, slightly emarginate at the apex, about 6 mm. long and broad; wings obovate, oblique, the claw about 2 mm. long, the blade 1-auriculate and sparsely villous at the base, broadly rounded at the apex, 6 to 6.5 mm. long, 3.5 to 4 mm. broad; carinal petals falcate, sometimes sparsely villous on the carinal margin, the claw as in the wings, the blade rounded-auriculate on the vexillar side, subacute at the apex, about 6.5 mm. long and 3 mm. broad; stamens glabrous, the filaments thicker than the oblong anthers; ovary 1-ovulate, stipitate, canescent-hairy, surrounded at the base with a cuplike disk; style short (about 1.5 mm. long), glabrous or sparsely villous.

Young fruits sparsely villosulous, long-stipitate (the stipe about 1.5 cm. long, gray-pubescent); mature fruits wanting.

Type in U. S. National Herbarium, no. 841737, collected at Zacuapan, Veracruz, Mexico, in flower, April, 1907, by C. A. Purpus (no. 2430).

Additional specimens have been examined as follows:

MEXICO: Zacuapan, Veracruz, flowers and young fruits, April, 1913, *Purpus* 6327. Córdoba Valley, Veracruz, flowers, February 25, 1866, *Bourgeau* 1987.

GUATEMALA: San Gerónimo, Sierra de las Minas, altitude about 1,300 meters, flowers, March 1, 1907, *Kellerman* 6359.

This species, represented in all collections at my disposal, was uniformly labeled *M. angustifolium* Vog., apparently on the authority of Hemsley. It differs, however, in the peculiar setulose indument of the inflorescence, in the size of the leaflets, and in the shape and dimensions of the floral parts.

BURSERACEAE.

TWO PANAMANIAN SPECIES OF *PROTIUM*.*Protium ternatum* Pittier, sp. nov.

A small tree, with smooth gray bark.

Leaves membranous, glabrous, ternate, 15 to 30 cm. long, the petioles stout, subterete, 2.5 to 3.5 cm. long; leaflets large, petiolulate, the petiolules canaliculate, thickened at the apex, those of the lateral ones 0.7 to 1.5 cm. long, that of the terminal one 2.5 to 4 cm. long, the blades ovate-elliptic, acute at the base, obtusely short-acuminate at the apex, 10 to 22 cm. long, 4 to 8 cm. broad, the costa prominent on both sides, the main lateral veins (about 10) and the minor venation prominulous and reticulate.

Inflorescences up to 15 cm. long, axillary, ramified from the base, few-flowered, glabrous, the branches slender and angular; flowers pedicellate, greenish yellow, the pedicels 3 to 5 mm. long; calyx shallowly 4-lobulate, glabrous; petals 4, broadly ovate, obtuse or sometimes acute at the apex, 2.5 mm. long, 1.6 to 2.2 mm. broad, glabrous or sometimes minutely pubescent toward the tip; stamens 8, the filaments broader at the base, about 2 mm. long, the anthers small, ovoid; disk thick, annular, sulcate, glabrous, covering about half the ovary; ovary subglobose, glabrous, 4 or 5-celled, the style very short, the stigma 4 or 5-lobed.

Drupe oblique-ovoid, acute, apiculate, about 1 cm. long, glabrous, orange-red.

Type in the U. S. National Herbarium, no. 679294, collected along Rfo Fató (Nombre de Dios), Province of Colón, Panama, in flower, August 16, 1911, by H. Pittier (no. 4190). A second collection, same locality and date, is Pittier 4191.

This species seems to be nearly related to *Protium guianense* Marchal, but it differs in the peculiar structure of the petiolules, the size of the leaflets, the length of the pedicels, and the shape of the petals. Besides, the leaves have always three leaflets or fewer, while in *P. guianense* they are sometimes bijugate.

Protium inconforme Pittier, sp. nov.

A small tree, the bark of the branchlets smooth and light gray.

Leaves glabrous, 2 or 3-foliate, up to 12 cm. long, the petioles rather slender, at first distinctly canaliculate above, 1 to 1.5 cm. long; leaflets very variable in size, the petiolules 0.3 to 1 cm. long, canaliculate, the blades narrowly elliptic to ovate, obtuse at the base, obtuse or obtusely subacuminate at the apex, 4 to 10 cm. long, 1.5 to 4 cm. broad, the costa prominent on both faces, the main nerves (about 12) and the reticulate veins and veinlets more or less prominent beneath.

Inflorescences short, in solitary axillary few-flowered racemes, up to 2.5 cm. long, the rachis sparsely puberulous; flowers pediceled, pale yellow, the pedicels 2 to 3 mm. long, puberulous, provided at the base with a brown scarious ciliate deciduous bractlet; calyx 4 or 5-lobed, the lobes broad, short, obtuse; petals 4 or 5, 2.5 mm. long, 1 to 1.5 mm. broad, subacute, glabrous or minutely puberulous; stamens 8 or 10, the filaments 0.7 to 1 mm. long, the anthers small, ovoid; ovary subovoid or globose, surrounded by the glabrous disk only at the base, sparsely hairy, about 0.8 mm. long, the style much shorter, 4 or 5-lobulate.

Fruit ovoid-oblong, stipitate, apiculate, 2-seeded, glabrous, about 2 cm. long; seeds somewhat 3-carinate, 1.1 cm. long.

Type in the U. S. National Herbarium, no. 677733, collected in forest near Caldera, Chiriquí, Panama, in flower and fruit, March 21, 1911, by H. Pittier (no. 3350).

The most conspicuous feature of this species consists in the irregularity of the leaves, which are at times 2-foliate, one of the leaflets then with a longer petiolule, and at other times regularly ternate. But for this particular the description agrees in the main with that of *Protium hostmanni* Engl. and also with *Protium confusum* (Rose) Pittier,⁸ both of which have from 3 to 7 leaflets.

The tree is known among the natives under the name of "chutra."

RUTACEAE.

THREE NEW SPECIES OF ZANTHOXYLUM FROM PANAMA.

Zanthoxylum panamense P. Wils., sp. nov.

A tree, 10 to 15 meters high, the trunk 30 cm. in diameter at the base, armed in its lower third with conical corky prickles; twigs puberulent with mostly appressed hairs, leaves odd-pinnate, 10 to 20 cm. long; petioles and rachis grooved above, glabrous or somewhat puberulent; leaflets 5 to 9, opposite or subopposite, oblong-lanceolate to obovate or elliptic, 4 to 9 cm. long, 2 to 4 cm. broad, acuminate at the apex, acute to cuneate and more or less inequilateral at the base, short-petioluled or sessile, lustrous and glabrous above, paler beneath, glabrous and reticulate-veined, the margin entire or obscurely crenulate; pellucid glands scattered, unequal in size, the marginal glands rather distant; inflorescence terminal, paniculate, the branches densely puberulent; flowers unknown; sepals 5, triangular; immature follicles 3 or 4.

Type in the U. S. National Herbarium, no. 677881, collected on Mamei Hill, Canal Zone, Panama, altitude 20 to 90 meters, July 6, 1911, by H. Pittier (no. 3809).

The corky prickles of the lower third of the trunk are said to be often hollow and inhabited by ants.

Zanthoxylum pittieri P. Wils., sp. nov.

A tree, 20 meters or more in height, with a trunk 35 to 40 cm. in diameter, armed with stout hard-corky compressed subpyramidal elevations 2.5 to 3 cm. broad, these supporting prickles; branches bearing grayish brown, helmet-shaped prickles 8 to 12 mm. long; petiole and rachis terete or nearly so, puberulent; leaves even-pinnate, 25 to 30 cm. long; leaflets 6 or 8, alternate, short-petioluled, oblong-oval to oval, 8 to 14 cm. long, 5.5 to 8 cm. broad, rounded and with a short broad mucro at the apex, inequilateral and somewhat rounded at the base, entire, glabrous and shining above, paler and more or less puberulent (especially on the midrib and veins) beneath, the lateral veins 5 to 8 mm. distant, prominent, the veinlets reticulate; panicle 20 to 25 cm. long, the branches distant, lax, loosely flowered, minutely hispidulous with reddish hairs; calyx of the (immature) staminate flowers 1 to 1.2 mm. broad, the lobes 5, suborbicular; petals 5, ovate to elliptic, 2 mm. long, 1 mm. broad; stamens 5, the anthers elliptic; abortive carpels 3; pistillate flowers and follicles unknown.

Type in the U. S. National Herbarium, no. 716006, collected at Boca de Paurandó, on Sambú River, southern Darién, Panama, altitude 20 meters, February, 1912, by H. Pittier (no. 5713).

⁸ *Icica confusa* Rose, N. Amer. Fl. 25: 260. 1911.

Zanthoxylum setulosum P. Wils., sp. nov.

A tree, 10 to 15 meters high, with the twigs, rachis, petioles, foliage, and branches of the inflorescence hispidulous; branches unarmed, or armed with prickles 2 to 2.5 mm. long; leaves odd-pinnate, 15 to 35 cm. long; leaflets 17 to 21, opposite or subopposite, oblong-lanceolate, 3 to 7 cm. long, 1 to 1.8 cm. broad, long-acuminate at the apex, inequilateral and more or less acute at the base, dark green and hispidulous (especially along the midrib) above, paler and hispidulous on the midrib and veins beneath, sessile, the margin crenulate; glands bordering the margin pellucid; inflorescence paniculate; flowers unknown; sepals 5, hispidulous; immature follicles 5.

Type in the U. S. National Herbarium, no. 678564, collected on rocky exposed slopes along the Chagres River above Alhajuela, Province of Panama, Panama, May 13, 1911, by H. Pittier (no. 3515).

THEACEAE.**A NEW SPECIES OF EURYA FROM PANAMA.****Eurya seemanniana** Pittier, sp. nov.

A tree of medium size; bark of twigs smooth and sparsely verrucose on older parts, densely hairy on young growth.

Leaves petiolate, subcoriaceous; petioles hairy, canaliculate, 1.5 cm. long, obscurely decurrent; leaf blades ovate-lanceolate, acuminate, decurrent to the base of the petiole by 2 narrow hairy wings, 7 to 10 cm. long, 2.5 to 4 cm. broad, glabrous above, with salient veins, silky-pubescent beneath, the margin entire.

Flowers polygamous, pedicellate, in clusters of 3 or 4 in the axils of the leaves, or in former foliate buds, opening one at a time in each cluster; pedicels 3 to 8 mm. long, hairy, provided at the base with a small ovate-acuminate tomentose bract about 3 mm. long; bractlets suborbicular, about 2 mm. long and 3 mm. broad, hairy outside, sepal-like and adherent to the calyx; sepals ovate-rounded, 4 mm. long and broad, coriaceous, silky-hairy outside; petals connate at base, oval, more or less rounded and reflexed at the tip, 6 to 8 mm. long, glabrous, white; stamens 23 to 25, 4 or 5 adherent to the base of each petal, about 2.2 mm. long, reduced to filaments in fertile flowers; pistil 3.5 mm. long; ovary ovate, attenuate to a short style; stigmas 3, ovate-acuminate, white, divided to the base.

Fruit not known.

Type in the U. S. National Herbarium, no. 677040, collected on the edge of pastures around El Boquete, Chiriquí, Panama, altitude 1,000 to 1,300 meters, in flower, March 3, 1911, by H. Pittier (no. 2944).

This species is probably the plant collected by Seemann (no. 1153) in the same locality and left unnamed by him. It is nearly related to *E. sericea* (Humb. & Bonpl.) Szysz., but differs in having the leaves smaller, with entire margin and a winged petiole, in its pedicellate flowers, and in its short hairy calyx.

SAPOTACEAE.**THE CENTRAL AMERICAN SPECIES OF LUCUMA.**

On several occasions⁹ I have described species of *Lucuma* proceeding from various parts of Central America, but mainly from Panama. Further studies with reference to a few of these trees have shown that

⁹ Contr. U. S. Nat. Herb. 13: 457. 1912; 18: 85. 1914; 18: 166. 1916.

two of them have been placed in the wrong genus and should be referred to *Labatia*, as they have hairy fruits and a calyx formed by two pairs of sepals. These are my *Lucuma standleyana* and *L. sambuensis*.¹⁰ The mistake was due to the incompleteness of the specimens at my disposal, aided no doubt by my being unfamiliar with a genus not known before to exist in Central America.

Lately two new species of *Lucuma* have been recognized in the unnamed part of my collection, and these are described below. The number of species reported from Central America thus remains at five, of which two have almost always pentamerous flowers, two have hexamerous flowers with 8 or 9-celled ovaries, and the remaining one has 6 sepals but is pentamerous in the other parts of the flower. This last species, *L. sclerocarpa*, is remarkable also on account of its sclerotic fruits, which are perhaps unique in the genus.

The chief distinguishing characters of these five species are brought together in the following key.

Fruit sclerotic, pyriform, one-seeded. Sepals 6; corolla, androecium, and ovary pentamerous. (Panama.)-----1. *L. sclerocarpa* Pittier.

Fruit berry-like, with a fleshy mesocarp.

Ovary 8 to 9-celled; sepals and corolla lobes 6. Primary veins of the leaves 12 to 15.

Corolla 14 to 14.5 mm. long, hairy within. (Panama.)

2. *L. glabrifolia* Pittier.

Corolla 11.5 to 12 mm. long, glabrous within. (Guatemala.)

3. *L. laeteviridis* Pittier.

Fruit depressed-globose, 1 to 5-seeded, the ovary 5-celled. (Costa Rica; cultivated.)-----4. *L. obovata* H. B. K.

Fruit fusiform, truncate at the base, obtusely attenuate at the apex, 1-seeded, the ovary 6-celled. (Central America.)

5. *L. salicifolia* H. B. K.

This key does not complete the possible list of species of *Lucuma* in Central America. Up to 1910, when I started studying this interesting group, about 8 species of Sapotaceae had been reported from the region between the Isthmus of Tehuantepec and that of Darién. To-day 27 species are listed.

Lucuma glabrifolia Pittier, sp. nov.

A small tree with pyramidal crown; branchlets glabrous; leaf buds minutely ferruginous-pubescent.

Leaves membranous, congested on the new growth at the ends of the branchlets, glabrous, the petioles slender, semiterete, 2 to 3 cm. long, the blades obovate, long-cuneate at the base, abruptly and shortly obtuse-acuminate at the apex, 11 to 20 cm. long, 4 to 8.5 cm. broad, light green and lustrous above, paler and dull beneath, entire, the primary veins 12 to 15, light colored when dry, conspicuous but neither impressed nor prominent above, prominent (like the costa) beneath, the intervenal spaces minutely reticulate.

Flowers pedicellate, rather short and broad, in clusters of 3 to 5 at the ends of the branchlets; basal bractlets small, hairy, deciduous; pedicels minutely

¹⁰ *Labatia standleyana* Pittier. *Lucuma standleyana* Pittier, Contr. U. S. Nat. Herb. 18:166. 1916. *Labatia sambuensis* Pittier. *Lucuma sambuensis* Pittier, Contr. U. S. Nat. Herb. 18:167. 1916.

ferruginous-pubescent, about 1 cm. long; calyx short, broad, the sepals 6, ovate to oblong, concave, coriaceous, minutely ferruginous-pubescent without, 10 to 12 mm. long, 6 to 8 mm. broad, the interior ones narrower and longer; corolla tubular, pale yellow, 14 to 14.5 mm. long, the tube about 3 mm. long, glabrous or sparsely pilosulous without, the lobes 6, oblong, obtuse, glabrous on the margin, densely appressed-villous at the middle without, the whole corolla more or less grayish-pilosulous inside, principally at the base of and on the lobes; staminodia linear, acute, 3 to 3.5 mm. long, papillose near the apex, more or less grayish-hairy at the base; stamens 6, 2 to 3 mm. long, the filaments 0.5 to 1.5 mm. long, more or less hairy, the anthers cordate-lanceolate, about 2 mm. long; pistil 1.5 cm. long, the ovary ovoid or subglobose, 8 or 9-celled, ferruginous-hairy, the style thickest at the base, glabrous, distinctly capitate.

Fruit not known.

Type in the U. S. National Herbarium, no. 716608, collected in the forests around Pinogana, southern Darién, Panama, April 17, 1914, by H. Pittier (no. 6542).

Very closely related to *L. laeteviridis* Pittier, on account of the 8 or 9-celled ovary and certain other details, but differing in the greater size of the flowers, the indument of the corolla, the shape of the anthers, and the glabrous leaves.

Lucuma laeteviridis Pittier, sp. nov.

A deciduous tree, about 15 meters high, the trunk erect, about 35 cm. in diameter at the base, the crown ovoid-pyramidal; bark of the branchlets brownish, more or less appressed-pubescent on the younger parts.

Leaves membranous, congested at the ends of the branchlets, the petioles sulcate above, about 3 cm. long, minutely appressed-pubescent, the blades obovate-elliptic, cuneate at the base, abruptly obtuse-acuminate at the apex (the acumen narrow, 1 to 1.5 cm. long), 10 to 30 cm. long, 6 to 10 cm. broad, glabrous, entire, the primary veins 13 to 15, prominent on the light green lower face, subimpressed on the darker upper face.

Flowers rather large, solitary or several together in the axils of the leaves or on the defoliate branchlets, the basal bracts very small, scarious, hairy, deciduous, the pedicels slender, minutely pubescent, 1.2 to 1.7 cm. long; sepals 6, ovate, concave, minutely pubescent without, 6.5 to 8 mm. long, 6 cm. broad, the interior ones smaller; corolla tubular, yellowish white, 11.5 to 12 mm. long, glabrous at the base, covered on the upper half with appressed silvery hairs, the lobes 6, ovate, obtuse or truncate at the apex, 2 to 2.5 mm. long; staminodia 6, linear, minutely pubescent on the sides, papillose at the apex, about 3.5 mm. long; stamens 6, inserted very high on the corolla tube, glabrous, 3 to 3.5 mm. long, the filaments about 2 mm. long, the anthers introrse, ovate-oblong, attenuate toward the apex, cordate at the base, 2 to 2.5 mm. long; pistil 11 mm. long, the ovary subglobose, tomentose, 8 or 9-celled, the cells 1-ovulate; style glabrous, subcapitate.

Fruit not known.

Type in the U. S. National Herbarium, no. 1,012,336, collected in forests at Las Playitas, Department of Izabal, Guatemala, May 18, 1919, by H. Pittier (no. 8534).

In this species the calyx, corolla, and androecium are hexamerous, and the ovary is 8 or 9-celled, a combination not reported for any other member of the genus except *L. glabrifolia*, which excludes these two trees from the nearly related groups. In the absence of fruit their real place remains doubtful. Among the natives of the Motagua Valley the tree is called "ingerto de montaña," which would indicate a supposed relation to *Calocarpum viride*; the fruit is the "zapotillo calenturiento."

A NEW SPECIES OF SIDEROXYLON.

Sideroxylon hondurensis Pittier, sp. nov.

A large tree, about 18 meters high; crown broad, divaricately branched; younger branchlets minutely pubescent.

Leaves alternate, at first membranous and more or less puberulous, with age coriaceous, glabrous and glossy above; petioles semiterete, canaliculate, 1 to 1.5 cm. long; blades ovate-oblong or ovate-elliptic, more or less rounded-cuneate and slightly decurrent at the base, subacuminate and obtuse at the apex, 7 to 13 cm. long, 3 to 6 cm. broad, the costa prominent beneath, the primary veins about 17, prominulous, distant, strongly arcuate close to the margin.

Flowers pedicellate, numerous in clusters in the axils of defoliate nodes of the preceding year's growth, the bracts very small, scarious, pubescent; pedicels pubescent, 3 to 5 mm. long; calyx 5-lobate, about 4.3 mm. in diameter, more or less puberulous, the lobes imbricate, unequal, ciliate, ovate, broadly rounded at the apex, 1.8 to 2.5 mm. long (measured from the center of the calyx), 1 to 1.5 mm. broad; corolla subrotate or broadly campanulate, greenish yellow, 5 to 6 mm. in diameter, the lobes 5, suborbicular, 1.5 to 2 mm. long and broad, glabrous except for the ciliate margin; staminodia 5, inserted at the lobular sinuses, often partly obsolete, linear-acute, entire, 0.9 to 1.2 mm. long, papillose at the apex; stamens 5, inserted at the base of the corolla tube, included, glabrous, about 1 mm. long, the filaments linear-apiculate, the anthers extrorse in bud, ovate; ovary depressed, 2-celled, hairy, 5-tuberculate at the base, attenuate to a short obtuse glabrous style.

Fruit not known.

Type in the U. S. National Herbarium, no. 1,012,335, collected on the banks of the Chamelecón River at La Florida, Department of Copán, Honduras, May 10, 1919, by H. Pittier (no. 8480).

VERBENACEAE.

THE MIDDLE AMERICAN AND MEXICAN SPECIES OF VITEX.

KEY TO SPECIES.

Cymes forming axillary or terminal panicles, these either subcylindric or broadest at the base and narrowed toward the apex; leaflets 3 to 7, but normally 5. PANICULATÆ.

Panicles subcylindric, narrow and short-branched.

Leaflets oblong-elliptic, softly hairy beneath, up to 20 cm. long; style glabrous. (Colombia.)

1. *V. columbiensis* Pittier.

Leaflets ovate or obovate, entirely glabrous and lustrous above; style sparsely hairy. (Colombia.)

2. *V. berteriana* Pittier.

Panicles ovate or pyramidal, usually ample. Style densely barbate at the base and hairy throughout. Leaflets entirely glabrous. (Mexico.)

3. *V. capulin* Pittier.

Leaflets rounded or subemarginate at the base.

Plant a shrub; corolla 12.5 mm. long. (Mexico.)

4. *V. pyramidata* Robinson.

Plant a tree; corolla 9 mm. long. (Yucatán.)

5. *V. gaumeri* Greenm.

Leaflets attenuate or cuneate at the base. Trees.

- Petioles 5 to 6 cm. long; corolla about 7.5 mm. long, barbate at the throat. (Panama.)-----6. *V. masoniana* Pittier.
- Petioles 9 to 12 cm. long; corolla 12 to 14 mm. long, puberulous at the throat. (Central America.)-----7. *V. longeracemosa* Pittier.
- Cymes not paniculate, few-flowered, sometimes in subcorymbose inflorescences; leaflets 3 to 7, normally 3 or 5. CYMOSAE.
- Cymes simple, long-pedunculate.
- Leaves 3-foliolate. Corolla tube 3 times as long as the calyx. (Trinidad, Venezuela.)-----8. *V. divaricata* Swartz.
- Leaves 5-foliolate.
- Leaflets sessile or almost so; corolla tube only twice as long as the calyx. (Venezuela.)-----9. *V. bignonioides* H. B. K.
- Leaflets distinctly petiolulate; corolla tube much longer than the calyx.
- Corolla woolly at the throat; calyx distinctly but shortly repand-dentate. (Trinidad, Venezuela.)-----10. *V. capitata* Vahl.
- Corolla almost glabrous at the throat; calyx hardly denticulate. (British Guiana.)-----11. *V. schomburgkiana* Schauer.
- Cymes corymbose.
- Leaflets 3.
- Petioles, rachis of the inflorescence, and inferior face of the leaflets softly tomentose. (Mexico.)-----12. *V. mollis* H. B. K.
- Petioles and rachis of the inflorescence minutely pubescent, the mature leaflets glabrous. (Panama.)-----13. *V. floridula* Duchass. & Walp.
- Leaflets 5 or 7.
- Calyx distinctly toothed; leaflets gray-tomentose beneath. (Brazil, Colombia.)-----14. *V. cymosa* Bert.
- Calyx hardly denticulate; leaflets glabrous. (Venezuela.)
15. *V. orinocensis* H. B. K.

DESCRIPTION OF SPECIES.

Vitex columbiensis Pittier, sp. nov.

A tree, 10 meters high; trunk 30 cm. in diameter at the base; new growth, petioles, and rachis of the inflorescence more or less puberulous.

Leaves 4 or 5-foliolate, the petioles stout, subcanaliculate, 3.5 to 6.5 cm. long; petiolules 2 to 7 mm. long; leaflet blades oblong-elliptic or obovate acutely attenuate at the base, obtuse (or even emarginate), acute, or acutely subacuminate at the apex, 3.5 to 20 cm. long, 2 to 7 cm. broad, glabrous and impressed-reticulate above, densely and sordidly pilose-tomentose beneath, with prominent costa and lateral veins.

Cymes in narrow axillary elongate panicles 10 to 19 cm. long, the main rachis slender, the peduncles 4 to 7 cm. long, the branchlets not over 3 cm. long; bractlets oblong or lanceolate, 3 to 4 mm. long, densely grayish-hairy; pedicels 1 to 3.5 mm. long, grayish-pubescent; calyx campanulate, grayish-hairy, 4 mm. long, 5 or 6-toothed, the teeth nearly 1 mm. long, narrow, obtuse or subacute; corolla blue, 10 mm. long, glandular-pubescent without, hairy at the insertion of the stamens and at the base of the median lobe within, the tube 3.8 mm. long, the inferior median lobe suborbicular, about 4 mm. long and broad, the upper lobes rounded and very small (1 mm. long); stamens didynamous, exserted, the longer ones about 4.5 mm. long, the filaments densely hairy at the base and at the tip, sparsely so between, the anther cells divaricate; ovary subglobose, hairy, the style 4.7 mm. long, straight, thicker and bifid at the apex, glabrous.

Drupe not seen.

Type in the U. S. National Herbarium, no. 537283, collected on the trail from Norosí to Tiquisio, Lands of Loba, Department of Bolívar, Colombia, April or May, 1916, by H. M. Curran (no. 131).

Vitex berteriana Pittier, sp. nov.

A tree (?); branchlets, petioles, and rachis of inflorescence more or less puberulous or glabrescent.

Leaves 5-foliolate, the petioles broad, flattened and shallowly canaliculate, 3 to 3.5 cm. long, the petiolules glabrous, canaliculate, 2 to 7 mm. long; leaflet blades obovate or ovate, abruptly cuneate-attenuate at the base, obtuse, subemarginate or abruptly narrowed to a very short, obtuse or acute acumen at the apex, perfectly glabrous above, the costa impressed, the main veins prominulous, the lesser veins minutely prominulous-reticulate on both sides; blade of the middle leaflet 8 to 9 cm. long, 4.5 to 5 cm. broad, those of the lateral leaflets smaller.

Cymes in subcylindric panicles, these about 12 cm. long (the length of the leaves) and 3 cm. in diameter, the peduncles axillary and subterminal, 4 to 6 cm. long; lateral branchlets not more than 2.5 cm. long; bractlets acicular, hairy, up to 2 mm. long, caducous; lateral pedicels slender, pubescent, 2 to 3 mm. long, bearing at the apex 2 small caducous bractlets; central pedicel stout, 1 to 1.5 mm. long; calyx broadly cupulate, 5-toothed, sparsely and minutely pubescent, the teeth densely hairy at the tips, the 3 inferior ones longer and more approximate than the 2 superior ones, the sinuses rounded; corolla large and broad, 13.5 mm. long, purplish blue, the tube about 4 mm. long, over 2 mm. broad, glabrous at the base outside, minutely pilosulous above, within more or less hairy at the insertion of the stamens and on the side corresponding to the inferior median lobe; lobes obtuse, the inferior median one orbicular, 6.5 mm. long and 8.5 mm. broad, almost glabrous without, long-barbellate at the base within (the margin sinuate-lobulate), the lateral and superior lobes much smaller, entire, pubescent without, glabrous within; stamens didynamous, exerted, the longest ones about 6 mm. long, the filaments covered with long hairs, the anther cells ovate-fusiform, strongly divergent; ovary globose, finely pubescent, the style 7 mm. long, sparsely covered with long hairs.

Drupe not seen.

Type in the U. S. National Herbarium, no. 704075, collected in the forests of Santa Marta, State of Bolívar, Colombia, by H. H. Smith (no. 2107).

This species is characterized by its short-petiolate leaves, with leaflets absolutely glabrous and apparently quite developed at the blossoming time, and by the large flowers and the hairy style. Except that it belongs to the group with cylindrical panicles, it does not seem to be very closely related to any of the species known from northern South America.

Vitex capulin Pittier, sp. nov.

A tree, 6 to 10 meters high; young branchlets furfuraceous-pubescent.

Leaves subcoriaceous, 5-foliolate, the petioles canaliculate, more or less puberulous, 3.5 to 5 cm. long; petiolules puberulous, deeply canaliculate, 1 to 4 mm. long; leaflet blades ovate to elliptic-lanceolate, cuneate at the base, obtuse, acute, or subacuminate at the apex, glabrous on both faces, the costa and primary veins subimpressed and the reticulation indistinct on the upper face, the lower face pale, with the veins and venules prominulous, the reticulation close but minute and delicate; blade of the middle leaflet 3 to 10.5 cm. long, 3.5 to 4.5 cm. wide, those of the lateral leaflets much smaller.

Panicles axillary, as long as the leaves or longer (up to 15 cm. long), ovate, the lower branch longer, the peduncles 3.5 to 7 cm. long, more or less puberulous; bractlets ovate, acute, 2 to 2.5 mm. long, puberulous without, caducous or

subpersistent; flowers purple, the terminal one of each dichotomy subsessile, the lateral ones rather long-pedicceled, the pedicels pubescent, the terminal one up to 1 mm. long, the lateral ones 3 to 4 mm. long; calyx campanulate, 5-toothed, 4 mm. long, grayish-pubescent, usually subtended by two bractlets, the teeth broadly rounded-triangular, with acute sinuses; corolla 14 mm. long, pilosulous and minutely glandular without on the upper part of the tube and at the base of the lobes, the tube about 7 mm. long, rather narrow, barbellate at the insertion of the stamens within, the lobes rounded-obtuse, the inferior median one suborbicular, contracted at the base, about 4.5 mm. in diameter, barbate at the base, slightly sinuate on the margin, the lateral and inferior lobes much shorter, glabrous within; stamens didynamous, the longer pair about 6.5 mm. long, the filaments densely long-hairy, the anther cells divaricate; ovary small, (hardly 1 mm. in diameter), globose, densely white-pubescent, the style 8.5 mm. long, densely barbellate at the base, sparsely long-hairy throughout.

Drupe not seen.

Type in the U. S. National Herbarium, no. 386318, collected at Cuesta del Peregrino, State of Michoacán or Guerrero, Mexico, April 15, 1899, by E. Langlassé (no. 994). Another collection was made by the same collector at San Diego, in the same region, in flower, May 3, 1898 (*Langlassé* 133).

Vitex capulin differs from the other known Mexican species in its entirely glabrous leaflets and glandular calyx and corolla, and in the pronounced hairiness of the filaments and the style. The panicles, although distinctly broader at the base, are far less ample than those of *V. pyramidata* Robinson and *V. gaumeri* Greenm.

This species is known among the natives as "capulin," a name applied also to several species of the genus *Prunus*.

***Vitex longeracemosa* Pittier, sp. nov.**

A tree; young growth and petioles and the rachis of the inflorescence more or less cano-pubescent.

Leaves 5 or 6-foliolate, almost fully grown at time of flowering, the petioles stout, cano-pubescent or glabrescent, shallowly canaliculate, 9 to 12 cm. long; petiolules cano-pubescent, canaliculate, 1 to 2.2 cm. long; leaf blades ovate-elliptic to elliptic-lanceolate, more or less cuneate or acute at the base, acutely long-acuminate at the apex, pilosulous or glabrescent above, more or less canotomentulose beneath, the costa and primary veins impressed, the venules hardly conspicuous above, all very prominent and reticulate beneath; blade of the middle leaflet 14 to 17.5 cm. long, 4 to 6.5 cm. broad, those of the lateral leaflets 9 to 12 cm. long, 3.5 to 5.5 cm. broad.

Cymes paniculate, the rachis cano-pubescent; panicles axillary, ample, about 25 cm. long, or as long as the leaves, the peduncular part 3 to 10 cm. long; flowers bluish purple, all pedicelled; bracts and bractlets caducous, ovate or ovate-oblong, not over 2.5 mm. long, cano-hairy without, glabrous within; pedicels about 3 mm. long; calyx campanulate, 2.5 to 3 mm. long, puberulous-canescens, subbilabiate, acutely 5-toothed, 3 teeth on the inferior lip (the middle one broader and shorter), 2 teeth on the upper lip; corolla 12 to 14 mm. long, bilabiate, sparsely evanescent-puberulous without, barbellate at the insertion of the stamens and puberulous at the base of the inferior lip within, the tube 5.5 to 6 mm. long, the inferior lip trilobate, the median lobe longer (6 mm.) and broader (5 mm.) than the exterior ones (4 mm. long, 2.5 mm. broad), the superior lip bilobate, with short rounded lobes; stamens 4, exserted, the filaments arcuate, about 5.5 mm. long, sparsely covered with rather long hairs, the anthers ovate; ovary subglobose, glabrous at the base, cano-hairy on the upper half, the style glabrous, about 7 mm. long.

Fruit globose, about 12 mm. in diameter, the calyx apparently caducous and not accrescent.

Type in the U. S. National Herbarium, no. 1,012,333, collected at Quiriguá, Guatemala, May 31, 1919, by H. N. Whitford and L. R. Stadtmiller (no. 74).

I refer with doubt to this species specimens collected between La Zumbadora and San Antonio, Department of Copán, Honduras, in flower, May 8, 1919 (Pittier 8470), and at Quebradas, Department of Izabal, Guatemala, May 19, 1919 (Pittier 8509).

This species belongs to the group of *V. pyramidata* Robinson and *V. gaumeri* Greenm. From the first it differs in the indument, size, and shape of the leaves, in the hairy filaments, and in being a tree and not a shrub; from the latter it differs in the larger and reticulate leaflets, these cuneate at the base, and in the larger flowers with hairy and not pubescent filaments. The three species agree in their ample panicles and in their secondary characters.

Vitex capitata Vahl, Eclog. Amer. 2: 50. pl. 18. 1798.

A tree; new growth, petioles, rachis of the inflorescence, and lower face of the leaflets puberulous at first, glabrous at later stages.

Leaves 4 or 5-foliolate, appearing with the flowers, the petioles 6 to 12 cm. long, canaliculate, the petiolules 0.2 to 1 cm. long, the middle one longest; leaflet blades ovate to lanceolate, cuneate-attenuate at the base, more or less abruptly acuminate, with the apex obtuse or acute. 4.5 to 12.5 cm. long, 1.5 to 5 cm. broad, the costa impressed, the primary veins slightly prominent on the upper face, moderately conspicuous beneath, the reticulation very fine and inconspicuous.

Cymes axillary, 3 to 6-flowered, short, subcapitate, the peduncles about 2 cm. long, erect, the pedicels puberulous, 1.5 mm. long; bracts and bractlets caducous, not seen; calyx small, broadly campanulate, 2 mm. long or less, the margin sinuate or indistinctly 5-dentate; corolla large (17.5 mm. long); the tube 7.5 mm. long, puberulous without, hairy within at the insertion of the stamens, the lobes ovate to oblong, obtuse, more or less puberulous without, glabrescent within, the inferior median lobe 9.5 mm. long, the other lobes about 5 mm. long; stamens exserted, the filaments about 6.5 mm. long, hairy-puberulous at the base, glabrous above; anther cells strongly divaricate; ovary subglobose, glabrous except around the base of the style, this glabrous, equaling the stamens.

Drupe about 7 mm. long, glabrous, 2-seeded, bearing at the base the patelliform accrescent calyx.

SPECIMEN EXAMINED:

VENEZUELA: Sacupana, Orinoco Delta, flowers and fruit, April, 1896, *Rusby & Squires* 84, 257.

Distributed under the name of *Vitex cymosa* Bertero, but clearly the same plant as the one reported from Trinidad, which is situated in front of the Orinoco Delta and has a very similar flora.

CUCURBITACEAE.

THE SPECIES OF CALYCOPHYSUM.

The genus *Calycophysum*, established in 1854 by José Triana¹¹ upon specimens collected in the valleys of Cauca and Magdalena, Colombia, is closely related to *Sicana*, from which it differs mainly

¹¹ Nuevos géneros i especies de plantas 20. 1854.

in its inflated calyx and in the presence in the staminate flower of a trilobate pistillodium. The latter character, however, is not mentioned in the descriptions of the known species and apparently does not exist in the only flower I have been able to dissect.

The type species, *C. pedunculatum* Triana, is known only from the middle belt of Colombia, at altitudes of 850 to 1,500 meters, with a possible extension to Ecuador. This species was cultivated by Naudin in the gardens of the Museum at Paris and by the brothers Huber at Hyères, and produced at the latter place male flowers from which a published illustration¹² was made. From this illustration it may be seen that the calyx segments, of which Cogniaux gives only the dimensions, are broadly rounded-triangular, and that the corolla has very short lobes and is slightly longer, or at least not shorter, than the corolla.

In my recent explorations in Venezuela it was my good fortune to obtain specimens which at first seemed to agree very satisfactorily with the descriptions of *C. pedunculatum*, but which, on closer examination, were found to differ in general pubescence, length of the peduncles, and shape of the calyx and corolla, as well as in certain other details. These specimens are described below under the name *C. brevipes*, and photographic illustrations also are given.

As a variety *villosum*, Cogniaux¹³ described a collection made by Miguel Bang in Bolivia (no. 2244). The specimens are seemingly immature; but besides the characteristic indument of the petioles and peduncles, which are both remarkably stout, the calyx is larger and of a distinct shape and texture, and as the locality of the plant is far distant from that of typical *C. pedunculatum*, it may be inferred that the Bolivian specimens really represent another specific type, to be known as ***Calycophysum villosum*** (Cogn.) Pittier.

A third form, *C. gracile* Cogn.,¹⁴ has been described from the lower Magdalena Valley in Colombia. This is said to differ from the type species in the longer subulate teeth of the leaf margin, in the color of the calyx, the segments of which are shorter and narrower, and in the longer corolla. This difference in the length of the corolla, which, if constant, would form perhaps the best distinction between the two species, should, however, be considered cautiously. From observations upon the living Venezuelan plant I am inclined to believe that in the mature stage of the flower the corolla is in all cases longer than the calyx and Naudin's illustration, cited above, shows that in *C. pedunculatum* the corolla is at least equal to the calyx. The size and shape of the calyx and corolla, the length of the stamens, and the leaf characters seem better to differentiate the two species.

¹² Ann. Sci. Nat. IV. Bot. 18: 185. pl. 9. 1862.

¹³ *Calycophysum pedunculatum villosum* Cogn. Bull. Torrey Club 23: 17. 1896.

¹⁴ Bull. Acad. Sci. Belg. II. 49: 191. 1880.

In the National Herbarium there is one specimen, with male flower, of another *Calycophysum* collected in Santa Marta, Colombia, by Herbert H. Smith (no. 1603). This is labeled *C. pedunculatum*, but it so far disagrees with the description of that species, as well as with that of *C. gracile* and with my own plant, that there is little doubt that it represents a new species. It is here described as *C. cordatum*.

We may, then, recognize at the present time at least five species of *Calycophysum* which may be distinguished by the following key:

Leaves cordate; filaments 2 cm. long-----*C. cordatum* Pittier.

Leaves subtrilobate; filaments much shorter.

Calyx not over 3 cm. long, the segments narrow. Filaments 5 to 7 mm. long-----*C. gracile* Cogn.

Calyx more than 3 cm. long.

Segments of the calyx broad and somewhat rounded.

C. pedunculatum Triana.

Segments of the calyx narrow and acuminate.

Petioles and peduncles tomentose-pubescent-----*C. brevipes* Pittier.

Petioles and peduncles villous-tomentose with long hairs.

C. villosum (Cogn.) Pittier.

Calycophysum cordatum Pittier, sp. nov.

A vine, the stems glabrous or glabrescent. Leaves membranous, the petioles terete, 4 cm. long, minutely tomentose-pubescent, the blades cordate, short-acuminate, 8 to 10 cm. long, 9 to 11 cm. broad, remotely subulate-denticulate, light green and sparsely pubescent above, densely pubescent beneath, the basal sinus about 2-cm. deep and 1 cm. broad, subrectangular.

Staminate flowers solitary in the axils of the leaves; peduncles 9 to 12 cm. long, tomentose-pubescent, rather slender; calyx broadly campanulate, 3.5 to 4 cm. long, minutely grayish-tomentose, the lobes narrow, long-acuminate, 2 to 2.5 cm. long; corolla narrowly campanulate, glabrous, yellowish, longitudinally purplish-veined, with a broad purple spot at the base, 4 to 4.5 cm. long, the segments 2.5 to 3 cm. long, about 12 mm. broad, rounded-subacute at the apex; stamens 3, the filaments glabrous, 2 cm. long, the anthers 1 cm. long; pistilodium apparently none.

Pistillate flower and fruit not known.

Type in the U. S. National Herbarium, no. 533953, collected in Santa Marta, Colombia, altitude 2,000 meters, January, 1900, by H. H. Smith (no. 1603).

Calycophysum brevipes Pittier, sp. nov.

PLATES 27-30.

A robust vine, subligneous and up to 7 cm. thick at the base, ramose, the branchlets angular, sulcate, villous or villosulous. Leaves membranous, light green and more or less pilosulous above, pale green and densely tomentose-pubescent beneath, the petioles 3 to 4 cm. long, tomentose-pubescent, the blades subtrilobate, 7 to 18 cm. long, 10 to 14 cm. broad, the lateral lobes rounded or subacute, the median lobe longer, triangular, acute, the basal sinus rather narrow, rounded, 1.5 to 2.5 cm. deep, 1 to 2 cm. broad; tendrils 3 or 4-branched, stout, more or less tomentose, the petiolar part 1 to 4 cm. long.

Flowers solitary in the axils, the peduncles and calyx tomentose; calyx 3.5 cm. long, the segments 2.5 to 3 cm. long, 10 to 12 mm. broad at the base, acuminate; corolla pale reddish white, about 4.2 cm. long, the lobes reflexed, subobtusate at the apex, 5 to 7-ribbed, more or less pubescent on the ribs without, 1.5 to 2 cm. long, 6 to 7 mm. broad at the base. Male flowers immature, the peduncles

up to 10 cm. long. Pistillate flowers with stout peduncles 6 to 7 cm. long; staminodia not seen; ovary ovoid-cylindric, pubescent, 4.5 cm. long; style 2.5 cm. long, erect, glabrous; stigmas 3, distinct at the base, connivent at the apex and expanded into broad spreading subentire lobes.

Fruit indehiscent, ovoid, stipitate, glabrous, orange-yellow with lighter stripes and lines without, 12 to 15 cm. long, 7 to 9 cm. in diameter, the stipe 1.5 to 2 cm. long, 1.5 cm. thick, the peduncles thick, glabrous, up to 8 cm. long; seeds numerous, immersed in a copious watery white pulp, depressed, brownish with dark spots, 1 cm. long, about 5 mm. broad at the middle and not over 2 mm. thick, subnaviculiform, with one end subacute and narrow, the other broad and rounded.

Type in the U. S. National Herbarium, no. 987505, collected at the forest edge, upper slopes of Cotiza, near Caracas, Venezuela, altitude 1,400 to 1,700 meters, flowers and fruits, in September and November, 1917, by H. Pittier (no. 7381). Also collected in the same region, in staminate flower (*Pittier 7571*).

The fruits of this species, which are called "parcha de culebra," are rather ornamental. The pericarp turns hard at maturity. When the pulp surrounding the seeds is eaten, it tastes at first very sweet but later produces in the mouth and digestive canal an intense and painful burning sensation, accompanied by nausea and a rapid rise of temperature.

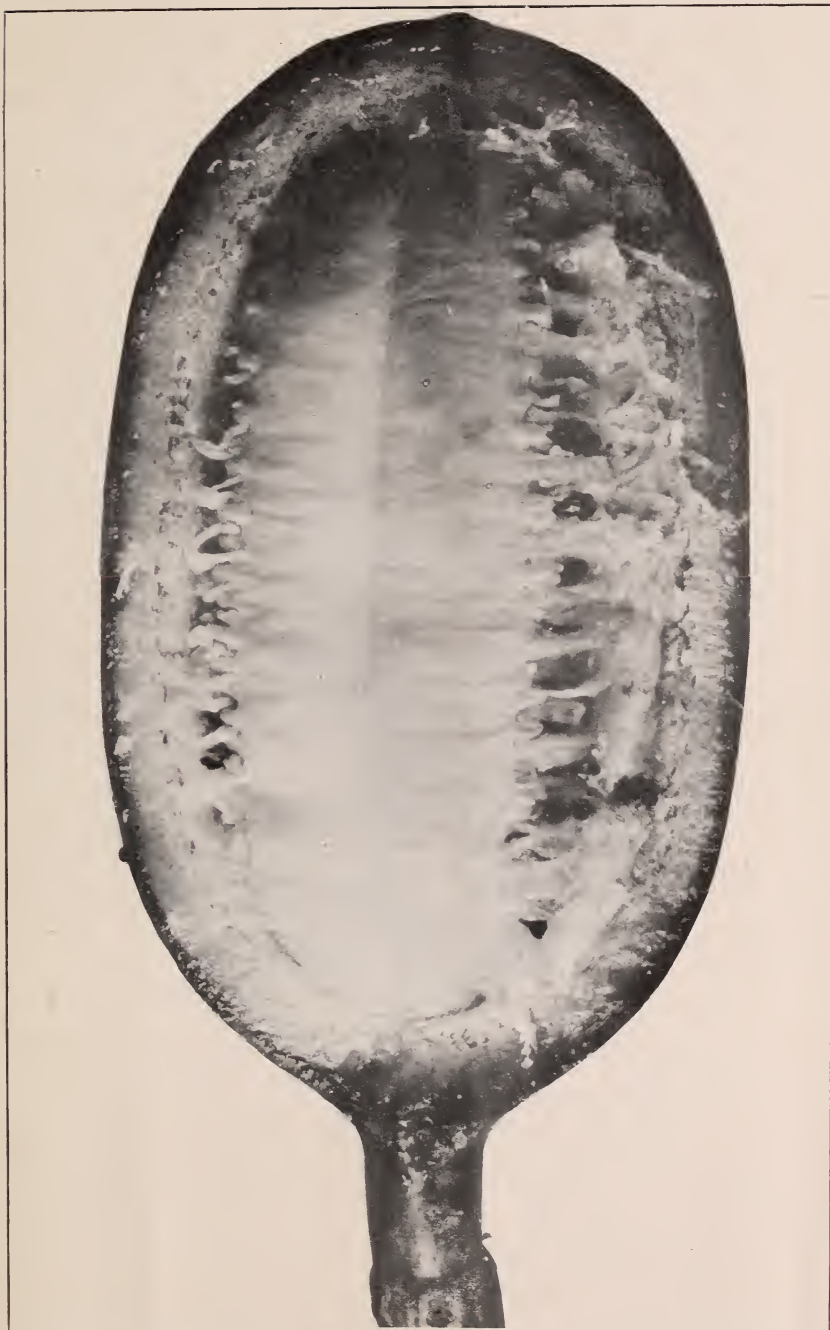
EXPLANATION OF PLATES 27-30.—*Calycophyllum brevipes* Pittier. Natural size.



CALYCOPHYLLUM BREVIPES PITTIER.



CALYCOPHYSUM BREVIPES PITTIER.



CALYCOPHYLLUM BREVIPES PITTIER.



CALYCOPHYLLUM BREVIPES PITTIER.

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